

April 1936

TECHNOLOGY REVIEW



1936

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technology review

Published by MIT

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— and Chesterfields
are usually there



they're mild and yet *They Satisfy*

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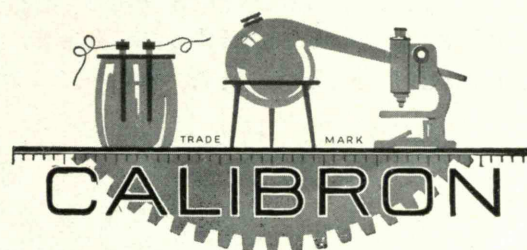
THE TECHNOLOGY REVIEW, April, 1936. Vol. XXXVIII, No. 7. Published monthly from October to May inclusive and in July at 10 Ferry Street, Concord, N. H. Publication date: twenty-seventh of the month preceding date of issue. Annual subscription \$3.50; Canadian and Foreign subscription \$4.00. Entered as second-class matter at the Post Office at Concord, N. H., under the Act of March 3, 1879.

THE TABULAR VIEW

ARTICLES in this issue relating to the Seventy-Fifth Anniversary of M.I.T. include President KARL T. COMPTON'S "Whither Bound?" and TREADWELL CLEVELAND'S "Technology Revisited." At his graduation from Williams College in 1897, Mr. Cleveland delivered the Philosophical Oration, and he was the author of the Graves Prize Essay. With these bays and laurels he entered the School of Philosophy at Columbia University and received his Master of Arts degree in 1898. After a year in the United States Forest Service, he was appointed a fellow in Psychology in Clark University, at that time exclusively a graduate school, under G. Stanley Hall. Now associated with publishing activities of the Institute, Mr. Cleveland has had extensive experience as author, editorial writer, and teacher. We welcome his paper as the objective view of one educated entirely in the liberal arts. ¶ Dr. Compton this year retires as President of the American Association for the Advancement of Science.

IN our February issue DR. PHILIP M. MORSE, Assistant Professor in the Department of Physics at M.I.T., contributed an article on the neutron which was a distinguished piece of scientific exposition for the layman. Again this month, in his article on the surface of metals, Dr. Morse clarifies and illuminates an obscure and difficult problem of science. ¶ DEAN A. FALES, Associate Professor of Automotive Engineering in the Institute's Department of Mechanical Engineering, knows the whims and frailties of the modern automobile. As he makes road test after road test of present-day models, he spots the many opportunities for increasing safety which he describes in his article on page 276. In a recent address before the Greater New York Safety Conference, Professor Fales' emphasis on the need for more safety caused widespread comment and approval.

WE welcome to membership in the Cover Club W. C. WEST, '11, of Chicago who contributes "Translucence" to our jacket this month as well as "Patrol" (page 272). We recently had the pleasure of viewing a large exhibition of Mr. West's pictures, and a stimulating experience it proved to be. He has a vast competence, not only on location with his camera, but in the dark room with his enlarger. His sense of the dramatic is ably abetted by his skill in tones and his versatility in print making. As Secretary, and then President, of the Chicago Camera Club, he has by precept and stimulation been influential in raising the standards of amateur photography. ¶ We salute with appreciation the numerous candidates who, with prints large and small, have presented themselves for membership in the Cover Club. We have already selected for use on forthcoming covers several photographs submitted by them. There is no limit to the number of applicants; we invite all who have unusual prints suitable for the cover to send them to us.



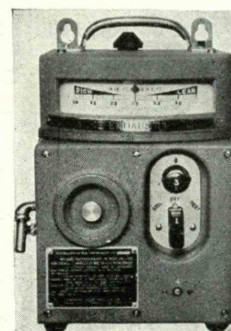
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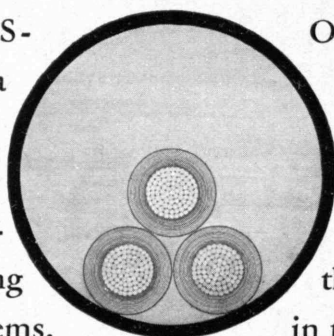
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SAFETY STANDARDS

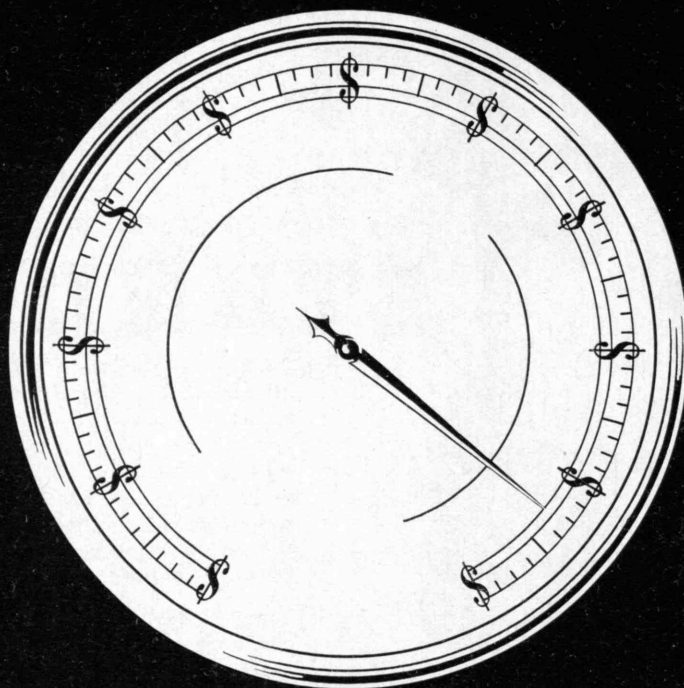
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for Engineers*



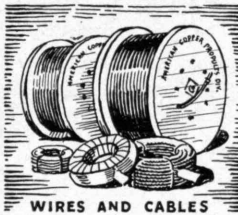
In designing piping for flexibility, over-safe guessing is impossible if economy is to be achieved. Yet accurate work involves a tremendous number of calculations. These time-consuming tasks have been done for you, and the whole subject authoritatively covered in the *Pittsburgh Piping Design Manual*, just published. The book will prove invaluable to those who design piping and we urge engineers in this field to write for a copy before the supply is exhausted. No charge or obligation. Please use your business stationery.

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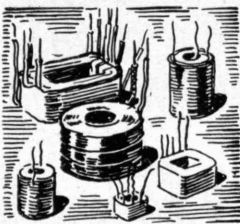
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INCA MANUFACTURING DIVISION,

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P-M-G METAL DIVISION,

with mills at Bayway, N. J.; manufacturers of copper alloy products, having special corrosion resistance and high physical qualities; rods, bars, wire, tubing and fittings, strip, sheet, rigid conduit, electric metallic tubing, sand castings and forgings.

HABIRSHAW CABLE & WIRE DIVISION,

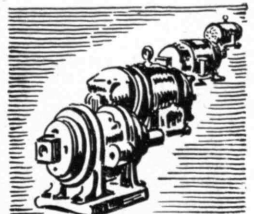
with mills at Yonkers, N. Y., and Bridgeport, Conn.; manufacturers of paper and varnished cambric insulated power cables; oil-filled and pressure cables; telephone, telegraph and signal wires; rubber and lead covered cables; also Habirshaw "Flame-Stop" Safecote rubber covered wires and cables — the quality product — for building uses.



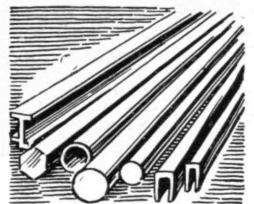
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UNDERGROUND CABLES

Blanchard

HIGH POWER VERTICAL Surface Grinders

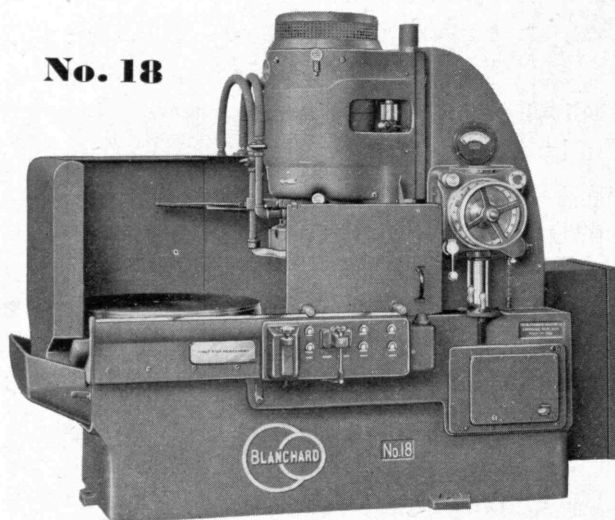
Is this flat surface a Blanchard job?

The question is always worth asking, if better than a roughing cut is required. The piece may be a casting, forging, or made from rolled stock; it may have parallel sides or be irregular; it may be steel, cast iron, brass, or non-metallic; if it has a flat surface to be machined the question "Is this a Blanchard job?" is worth asking.

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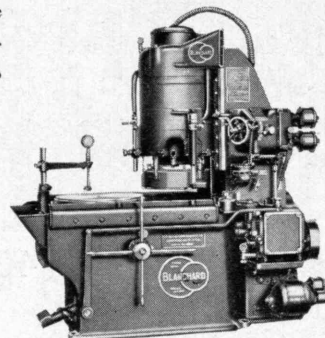
We have a fund of experience, gained in applying Blanchard Grinding to a wide variety of work, that can be brought to bear on your machining problems.

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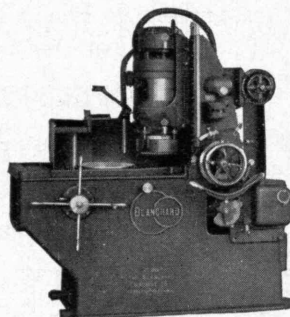


The No. 18 is a new addition to the Blanchard line of surface grinders. It is designed for work previously done on the No. 16 where finish must be more accurate or a higher rate of production is required. All who use or could use the No. 16 will be interested in the features of the No. 18.

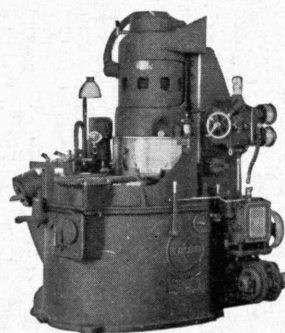
No. 16 — Applicable to a wide range of production work and also to die and tool work.



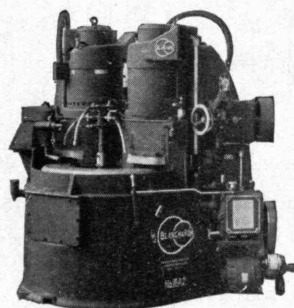
No. 10 — Suited to tool work, small lot production, and pieces under 18" diameter that must be ground one at a time.



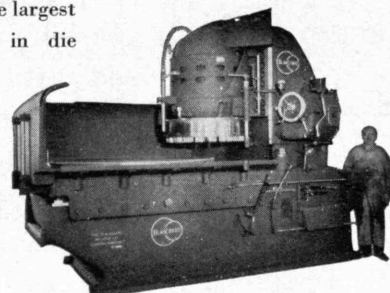
No. 16-A — A high-production machine for small parts in quantities. Chucking is either magnetic or in automatic fixtures.



No. 16-A2 — Two wheels, one roughing and one finishing, make it easy to remove more stock and produce finer finish.



No. 27-R — The largest Blanchard, used in die shops.



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"... Our colleges and universities and technical schools and particularly those skilled in research are henceforth to have their greatest usefulness to the Nation and to find a new place and importance in the sun."

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79,250 lbs. 33,850 lbs.

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Forging more than doubles strength.

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Smooth Forgings resist corrosion.

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Bespeak quality, and look the part

Increase salability of a product

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WRITE OUR ENGINEERING DEPARTMENT, —
SEND BLUE PRINTS, — WE WILL OFFER SUG-
GESTIONS AND GIVE ANALYSIS OF WHEN
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MAIL RETURNS

Conundrums

An astonishing number of readers have written The Review about P. J. Rulon's article, "For Sharpening Your Wits," in The Review for February (page 184). Several of the writers presented new conundrums to supplement Dr. Rulon's collection, and in response to the evident interest in enigmas, we present several of these submitted problems.

From THOMAS D. GREEN, '26:

An army 10 miles long marched 10 miles, so that the rear of the army stopped at the same place the front of the army started. Just as the army started its march a messenger started from the back of the army, running ahead to the front to deliver a package. As soon as he got to the front, he turned around without losing any time and ran back to the rear. He ran at the same speed all the time. The army marched at the same speed all the time. The messenger got back to the rear of the army just as it finished its march. How far did the messenger run?

Hartford, Conn.

FROM A BANKER:

A man went to a bank to cash a check. Being in a hurry, he didn't bother to count the money he received, since he always did business with the same bank and knew the teller very well. With the money in his pocket he hid himself to the nearest store, where he made purchases to the extent of 67 cents. When he received his change from his purchases he noticed that he seemed to have too much money. He therefore counted his resources and discovered that even after spending the 67 cents, he had twice as much as his check had called for. It became clear that the bank teller had given him too much, since the man had had no money with him when he entered the bank. The man got to figuring and discovered that the teller had reversed the dollars and cents on the check, giving him as many dollars as the check called for in cents and as many cents as the check called for in dollars. Of course, the man went immediately to the bank to return the excess funds. How much (in dollars and cents) should he have given back to the teller?

Boston, Mass.

FROM MINOR S. JAMESON, '96:

Three houses; a man living in each; a well for each house. Each man goes from his house to each of the three wells for water, daily, by a certain path, but none of these paths crosses any other. How are the paths laid out?

Chevy Chase, Md.

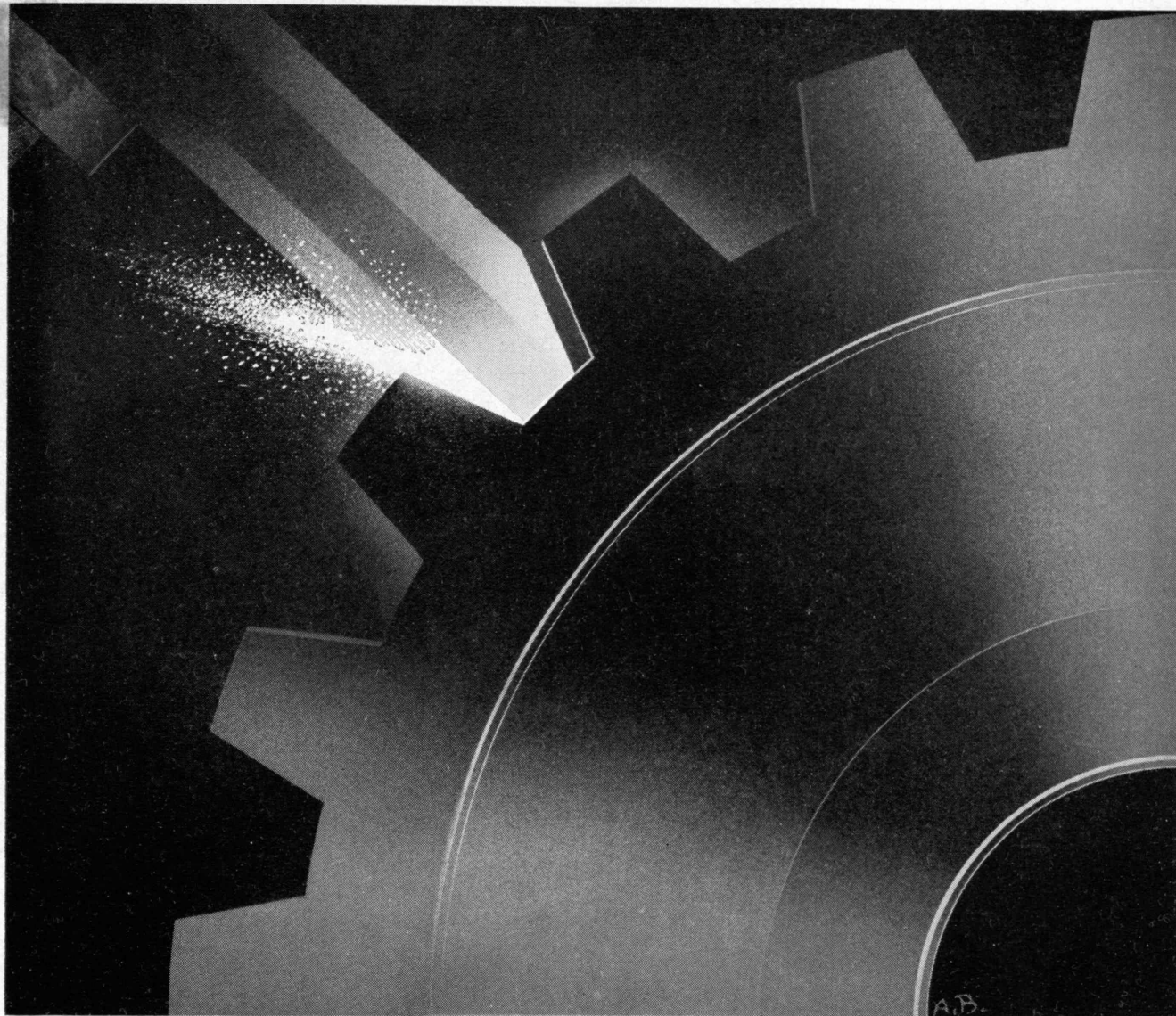
FROM JOHN R. PERKINS, '20:

A man has a plot of land 12 rods square which he wishes to plant with fruit trees. The centers of the trees must not be within one-half rod of the boundary of the land, or closer than a rod apart from each other. What is the greatest number of trees he can plant?

Wayne, Maine.

How Many Trees?

"A farmer's son once had a problem, the solution of which would not have been speeded by college training. To encourage industry in the boy, his father allotted him a 16th of an acre of ground and told him he could have all the produce from it. The son decided he would plant fruit trees on his tract, and his father told him not to plant his trees any closer than nine feet apart. In laying out the plot, the father made it square, measuring 52 feet, two inches, on each side. (This did not make exactly a 16th of an acre, but it made almost that amount, and it gave the boy exact dimensions with which to work.) The question was, of course, how to arrange the trees in rows so as to get the largest possible number of trees in the allotted space." This problem was included in Dr. Rulon's article with the suggested solution that a maximum of 41 trees could be planted. Here is a typical response to this solution: (*Concluded on page 250*)



MOLY helps to cut finishing costs

TAKE gears, for example: If in their production the distortion can be so minimized—and uniformly predicted—as to eliminate the necessity of grinding before lapping, the cost of one operation is saved.

This is exactly what one manufacturer was able to do by adopting Nickel Moly steels (SAE 4600 series) for his gears.

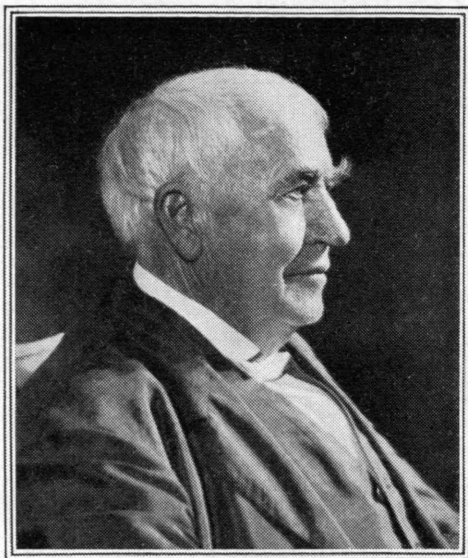
Similarly, throughout other operations in the production of finishing steel parts—in forging, heat-

treating, carburizing, machining—Moly steels have made it possible to cut costs substantially.

Our files may contain experiences or case histories paralleling some particular problem of your own. These data, as well as the co-operation of our experimental laboratory, are at your disposal. Meantime, our technical book, "Molybdenum," and our periodical news-sheet, "The Moly Matrix," will gladly be sent you on request.

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CUTS COSTS **CLIMAX Mo-lyb-den-um** **CREATES SALES**



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In all, Thomas A. Edison controlled about 1150 patents. Emanating from his genius are the many Edison products today. Edison Batteries control the movement of trains and safeguard millions of lives daily in every branch of railway service. Edison Emark Batteries will give superior service for your car. Ediphones, Edison Dictating Machines, enable executives to multiply their business capacity. Edison Portland Cement builds reservoirs, roads and edifices. Edison-excellence is also apparent in other products of Edison manufacture . . . spark plugs, magnetos and coils . . . electrical controls . . . medical gas.

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Edison Temperature Controls	E-K Medical Gas
Ediphones—for dictation	

Thomas A. Edison

THOMAS A. EDISON, INCORPORATED

West Orange, New Jersey

MAIL RETURNS

(Concluded from page 248)

FROM JAMES J. MAZZONI, '31:

First, I wish to state that I have greatly enjoyed reading each issue of *The Review*. P. J. Rulon's second collection of enigmas was particularly entertaining. While working some of the problems with a friend, Dr. Hetler of Washington University, he expressed the belief that he had found an error in the published solution of the young farmer's problem. I checked his work and found it correct. We will not guarantee this is the final answer, but he did succeed in adding another tree to the orchard. . . .
St. Louis, Mo.

Mr. Mazzoni and Dr. Hetler are, of course, correct. H. A. Romanowitz of Cincinnati, S. E. Moreton, Jr., '21, of Brookhaven, Miss., F. G. Smith, '11, of Waterbury, Conn., Alfred P. Steenson, '26, of Dorchester, and Frank Massa, '27, of Camden, N. J., submitted the same solution as Mr. Mazzoni. "The hexagon packs closer than the square," opined Mr. Steenson; "Who would think of spacing tubes in a heat exchanger with included angle 90 degrees?" queried Mr. Smith; "I understand that a great many fruit men set out their trees on the equilateral triangle in order to get more trees per acre," noted Mr. Moreton.

Karl R. Kennison, '08, of Waban, submitted two different solutions, showing how 43 trees could be planted in a square 50.91 feet on the side and 45 trees could be placed in a square 51.70 feet on the side. ¶ Charles L. Shedd, '02, sent a simplified solution for the problem of the lunch of the three men. ¶ If any reader wishes the details of any of these solutions, *The Review* will be happy to supply them.

Cover Club

FROM JOHN C. ALDEN, '35:

The announcement of the Cover Club in a recent issue of *The Review* quite interested me. The fineness of the covers has always attracted my attention and I think it is a great idea to recognize the people who take such wonderful photographs. . . .
Newton, Mass.

Lo, It is Here

FROM CLAUDE E. PATCH, '02:

Two items in *The March Review* are particularly interesting to me; both have to do with the Library. A short time ago I was guilty of attempting to get a little skit of mine into a competition. It was not good enough. In it I had referred to the list of summer reading given me at the close of my freshman year at Tech, and made the statement that I felt Technology would do well to continue to furnish reading guides to its alumni. Lo, it is here.

The other item is about the "Friends of the Library." I have been thinking recently of some copies of the *Illustrated London News* I have preserved in my attic. They are from the Civil War period and are mighty interesting and are in good condition. They came to me from my Dad who received them from a man who, if I recollect correctly, was a prisoner of war in England—I think at the end of the Crimean War. An English girl fell in love with him while still in prison and he was freed and married her. He came to America and, unless I have "drap' my watermel'n," gave the *News* to Dad. I have the old gent's picture which Dad put in our family album. I have thought it out of place to have such papers in a private family where future generations will be sure to burn them up, if they can be of use to any school. I have debated in my mind whether to give them to the local high school and have decided it would be unwise. Would these be of any use to Tech?

Boston, Mass.

NORTON ABRASIVES



Research

Abrasive Problems—grinding and polishing—hundreds of them are solved in Norton laboratories. Important in this work is heat-resisting laboratory equipment which the research engineer has made available through his development of abrasive products.

The little laboratory crucible may rightfully be regarded as a symbol of Norton abrasive research. Norton abrasive products also include practical laboratory ware for ignition, incineration and filtration. Refractories for the handling of heat—bricks, plates and cements for boilers, heat treating and enameling furnaces and ceramic kilns.

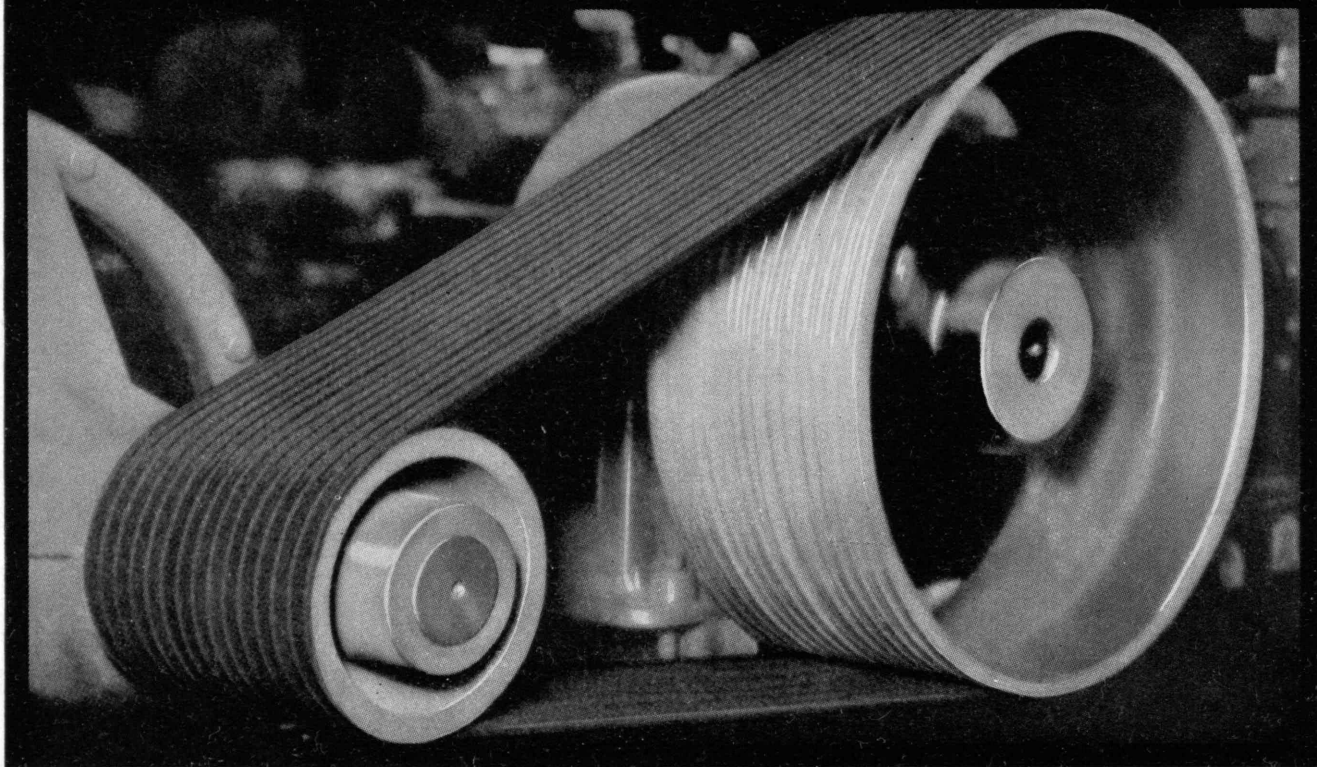
The scope of Norton Abrasives is far-reaching beyond the manufacture of Grinding Wheels and Polishing and Sharpening materials.

NORTON COMPANY

WORCESTER, MASS.

BEHR-MANNING, TROY, N.Y. (DIVISION OF NORTON COMPANY)

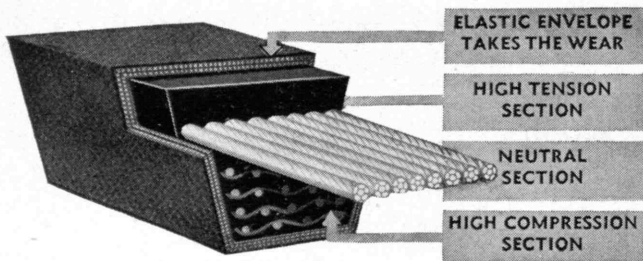
NO LOAFERS



HERE you see why the most efficient belts on high-speed, short center multiple drives are time-proved Goodyear Emerald Cord V Belts. *Every one carries its full share of the load!* There are no loafers because Goodyear V Belts are *precision-matched* in length and elasticity—because their *absolutely accurate cross-section* insures a firm-fitting

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1936

THE TECHNOLOGY REVIEW

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EDITED AT THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY

VOL. 38, NO. 7

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Seventy-Five Years Ago

The "Act to Incorporate the Massachusetts Institute of Technology" was approved by Governor John A. Andrew on April 10

Twenty Years Ago

With pageantry and great rejoicing M.I.T. took possession of its new plant in Cambridge on the Charles River



THE TECHNOLOGY REVIEW

Vol. 38, No. 7



April, 1936

The Trend of Affairs

In Praise of the Nose

AN instrument that can detect a millionth of a milligram and in some cases less than a billionth of a milligram of the vapors of hundreds of kinds of organic substances should inspire our admiration. That instrument, with its spectroscopic sensitivity and great convenience of operation, is the human nose."

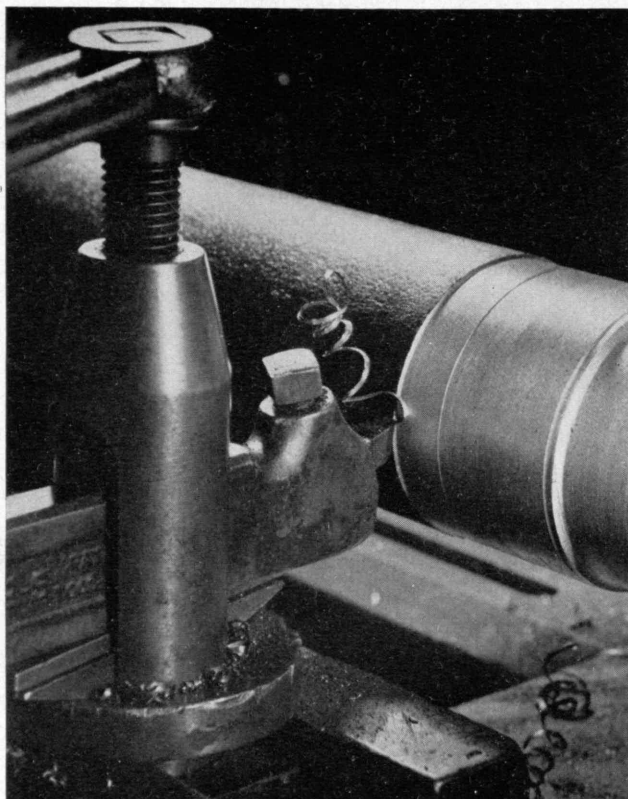
Ernest C. Crocker, '14, in a recent article in *Industrial and Engineering Chemistry* praises the powers of the nose to detect and distinguish odors, points out the great superiority of our ability to smell over our ability to taste, and elaborates a system described by him in *The Review* for February, 1934, by which all odors may be definitely characterized. All odors, he thinks, are analyzable — or decomposable by the processes of the scrutinizing consciousness — into one or more of four elementary odors, namely: (1) fragrant or sweet; (2) acid or sour; (3) burnt or empyreumatic; (4) caprylic or oenanthic. Any odor may be described and indexed by a four-digit number in which the digits correspond to the four elementary odors, while the magnitude of each, from one to eight, indicates the extent to which the corresponding element appears. Thus, the odor of acetic acid is described by the number, 3803; the third element, burnt or empyreumatic, does not appear in it at all.

By sipping a cubic centimeter sample of a liquid, it is just possible to detect the sweetness of a solution which contains 0.7% of sugar. That is, seven milligrams of sugar is about the smallest amount that can be tasted. The smallest amount of salt which can be tasted is about 0.15 milligrams; of tartaric acid, about 0.2 milligrams; of quinine, 0.016; of saccharin, 0.012. Experiments on smell have indicated that it is ordinarily necessary to sniff about 100 cubic centimeters of air in order to

detect the odor which is present in it — unless the odor is strong. Two ten-millionths of a milligram of vanillin is about the smallest amount of that substance which can be detected by that method. Roughly, about a billionth of a milligram in a liter of air is the smallest amount of a strongly odorous substance which can be smelled.

Our truly marvelous sense of smell enables us not merely to detect small quantities of material but also to distinguish and identify them. We speak of those whose eyesight is trained and in musical circles of those who have an ear trained for the distinctions of sound; yet most of us probably take our sense of taste and smell for granted, overlooking the real service that they may yield us and the genuine satisfaction and pleasure that they may bring. We once knew a man whose unerring sense of taste would tell him whether a teacup had been washed in soapy water. He was an unusual man, for it is still true, as Confucius long ago observed, that "everyone eats, but they are few who can distinguish flavors."

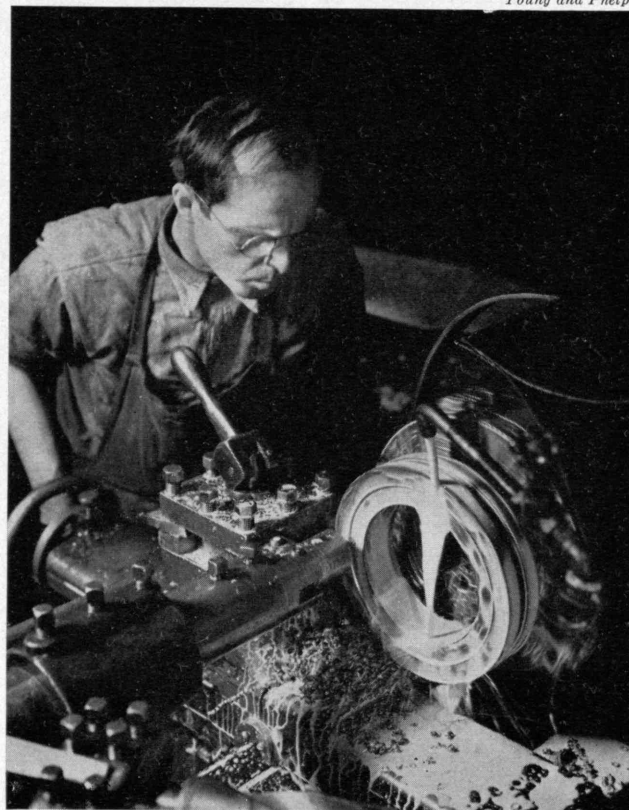
To the organic chemist a cultivated sense of smell is an aid of the first importance. It may even save his life, for he will recognize the odor of phosgene in what would seem to someone else to be only a faint mustiness. The genuine mustiness of an old book or an old house will not deceive him. It may give him pleasure by the associations that it arouses, as dried cake crumbs between the pages of a volume of Montaigne's "Essays" make us know that someone before us has found pleasure in the book. The poets have sung of things which may be seen — sunset and moonlight, fog and the shimmer of silk — of things which may be heard — thunder, "the silken, sad, uncertain rustling of each purple curtain," the voice of eloquence, the song of the skylark ("sweet be thy matin o'er moorland and lea") — but less often have they spoken of the things that can be smelled.



MACHINE TOOLS AT WORK

Left. Lathe tool working on cast-iron shaft
Below. Turning steel ring on turret lathe

Young and Phelps



When they have done so, however, it has been with a peculiar effectiveness. It seems to us that Bret Harte's "Newport Romance" owes much of that quality which gives us pleasure to

The delicate odor of mignonette,
The ghost of a dead and gone bouquet.

We can imagine Walt Whitman strolling — or swaggering — down Broadway, fully alive to all that he sees, hears, and smells: the odor of horses, of beer-wet sawdust, of roasted chestnuts, of coffee and herrings, stogies and Havanas, and garlic, of cosmetics, of humans, of oranges, and of the clean white pine of packing cases.

The olfactories may be fatigued by strong odors, just as the eyes may be fatigued by strong light; they will then cease to inform us. While they do inform us, however, their information is reliable. If a thing smells bad, it is, probably, bad — certain cheeses excepted; if it smells good — "a perfume-breathing pasty like the lip of Shirin luscious" — it is, probably, good.

The sense of smell does not suffer, however, as does vision, from diplopia. A friend's dog once consumed the liquid in which brandied peaches had been preserved. Afterward he took his customary place at the head of the steps leading to the porch, a position which permitted him to keep watch of the path by which the house was approached. Here in puzzled manner he gazed at the path experimentally, first with one eye, then with the other; it seemed evident that with both eyes he was seeing two paths where only one had been. Finally he decided that the matter was of no great importance to him and commenced to snooze, after the manner of dogs; to him the sense of sight was far less important than the

sense of smell. What a tragedy it would be in a dog's life to have diplopia of the nose. Long live the nose and more power to it!

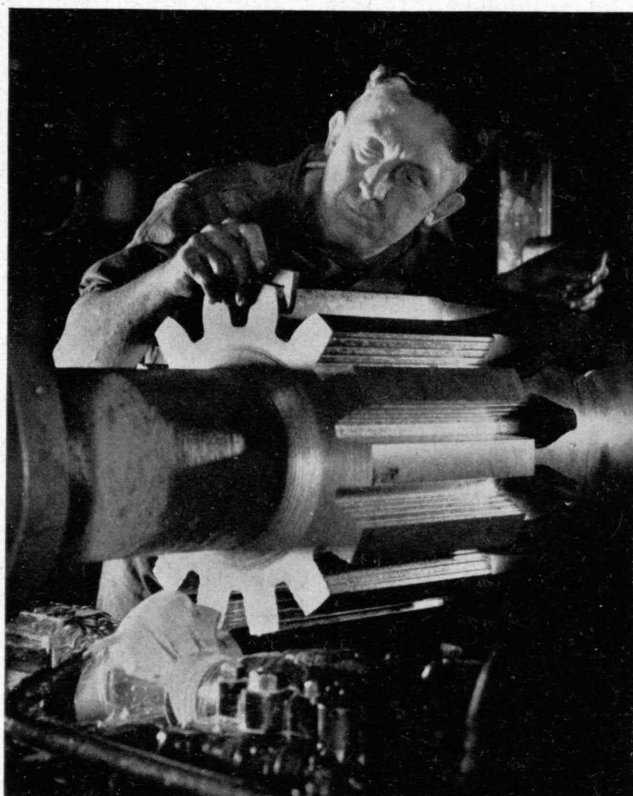
Racket and the Death Rate

STATISTICS to show the life expectancy of boiler makers are not immediately available, yet it is probable that the din of the boiler factory is a hazard to their longevity. The effect of noise in health and disease is a subject much in the fore recently through the efforts of Mayor La Guardia's noise-abatement commission in New York, with consequent publicity for the conclusions of medical men and scientists who have maintained for a long time that metropolitan cacophonies must be regulated. Dr. Foster Kennedy, professor of neurology at Cornell University Medical College, gave reason to this view by describing, at a symposium on noise held under the auspices of the commission and the New York County Medical Society, a series of experiments at Bellevue Hospital. These recorded changes in pressure on the brain caused by sudden noise, such as that made by the bursting of an inflated paper bag. In one experiment it was found that the normal pressure was raised 400% and was not restored until 30 seconds had passed. The record was secured by means of a small drum con-

taining a partial vacuum, placed against the soft portions of the heads of several patients from whom parts of the skull had previously been removed for other reasons. The drum registered vibrations in the brain and these were recorded by a needle tracing on paper.

"The undoubted effect of constant noise," Dr. Kennedy declared, "is disturbance of the blood vessel apparatus, and the increase in the degenerative processes in the heart and arteries." A difference of 19% in energy expenditure increment after working in a noisy, as compared with a quiet, environment has been shown experimentally and this Dr. Kennedy characterized as a main factor in the development of fatigue in workers.

A similar result effected by noise was reported late last year at the University of Indiana where Dr. Roland C. Davis showed experimentally that an uncontrollable muscular strain occurs within one ten-thousandth of a second after the noise, the speed of the strain indicating that it is caused by a muscular reflex. This tightening of the muscles was shown by attaching electrodes to the arms of students and using an oscillograph system to record the sound and the resulting tension in millionths of a second. In this experiment a shrill whistle took the place of bursting bags. Whether the students expected the sound or were surprised by it, the strain occurred. Even when they sought to will their muscles to stay relaxed, no difference was shown.



Young and Phelps

AS HEAVY INDUSTRY SPEEDS UP

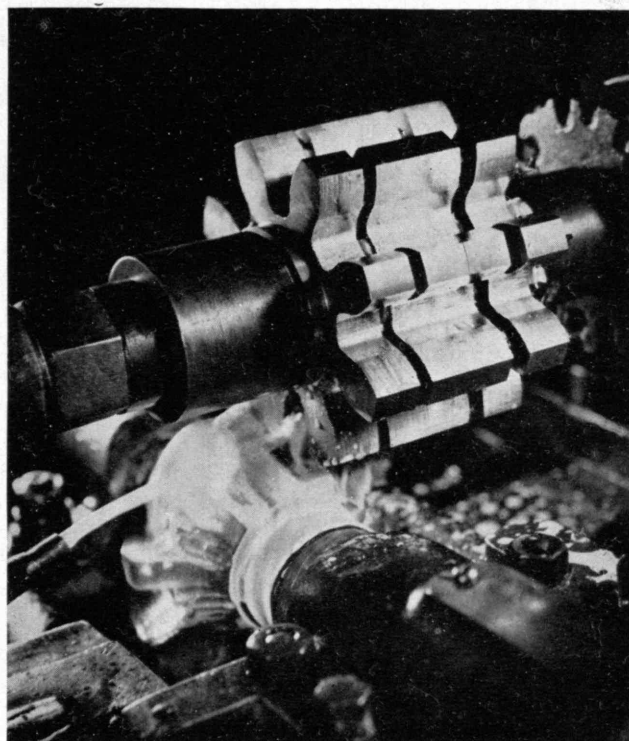
Above. Cutting pinion gear integral with shaft
Right. Making gears for industry

Increase in the proportionate contribution of diseases of the heart to the general mortality rate has been a subject conspicuously discussed in recent years. The greater urbanization of America with consequent exposure of more people to ever growing noises may well have so large a share in this increase that the efforts of abatement commissions can be justified on vital grounds as well as those of ordinary creature comfort.

Sterols and Life

DISCOVERIES, now being made by chemists, relating to a group of very complicated compounds known as sterols bid fare to illuminate many important problems arising in the health and in the disease of the human body. The sterols (the word has not yet found its way to many, even recent, dictionaries) and compounds derived from them are widely distributed, both in the animal and in the plant worlds. In other words, they appear to be concomitant with all living things, which suggests that they may well possess great significance for life processes in general.

The various sex hormones, for example, belong to the family of sterols; Vitamin D, essential for preventing rickets, is a member of the same family; the cardiac glycosides, naturally occurring plant products which are among the most powerful heart stimulants known, have been found to be derived from certain of the sterols; and, very recently, some of the cancer-producing substances have been shown to be closely related to these compounds. Experts in the field believe that future developments, growing out of a wider understanding of the whole related series of compounds comprising the sterols, reasonably may furnish new and better answers to some very vexing problems. For example, the



control of abnormal sex developments in young children may be aided or even solved. The discovery of a general cause for cancer in human beings may result from these investigations. Such an important result, however, should not be confused with finding a cure; this would be hailed, indeed, as one of the greatest of boons to mankind. Some investigators have predicted that certain chemicals fabricated along these lines may even be found to hold off old age to some extent.

The power of these compounds may be illustrated by the fact that the daily administration of a hundredth of a milligram (less than a millionth of an ounce) of one of the male sex hormones will give to the sluggish capon a full cockerel's comb within two weeks.

Cholesterol, the longest studied member of this important group of compounds, may be taken as a type. It has been recognized since the closing years of the Eighteenth Century. First isolated from gall stones, it received its name from the Greek words meaning "solid gall." Originally thought to be related to the fats, it was shown in 1815, by the French chemist, Chevreul, not to belong to that class of compounds. Gradually, its true chemical constitution has been worked out.

Built of but three elements, carbon, hydrogen, and oxygen, the sterols belong to the large class of organic compounds known as monohydroxy alcohols, which is to say, that they contain a single hydroxyl group. They are, as well, solid, crystalline alcohols, as the word means, literally. One of the requirements which chemists set themselves for a complete understanding of a compound, is to fix the relationship of each atom to every other one in a molecule and the fact, important as it is, that the sterols are alcohols must be likened to the opening of a small window which gives on an otherwise unexplored field. Something of the difficulties which have

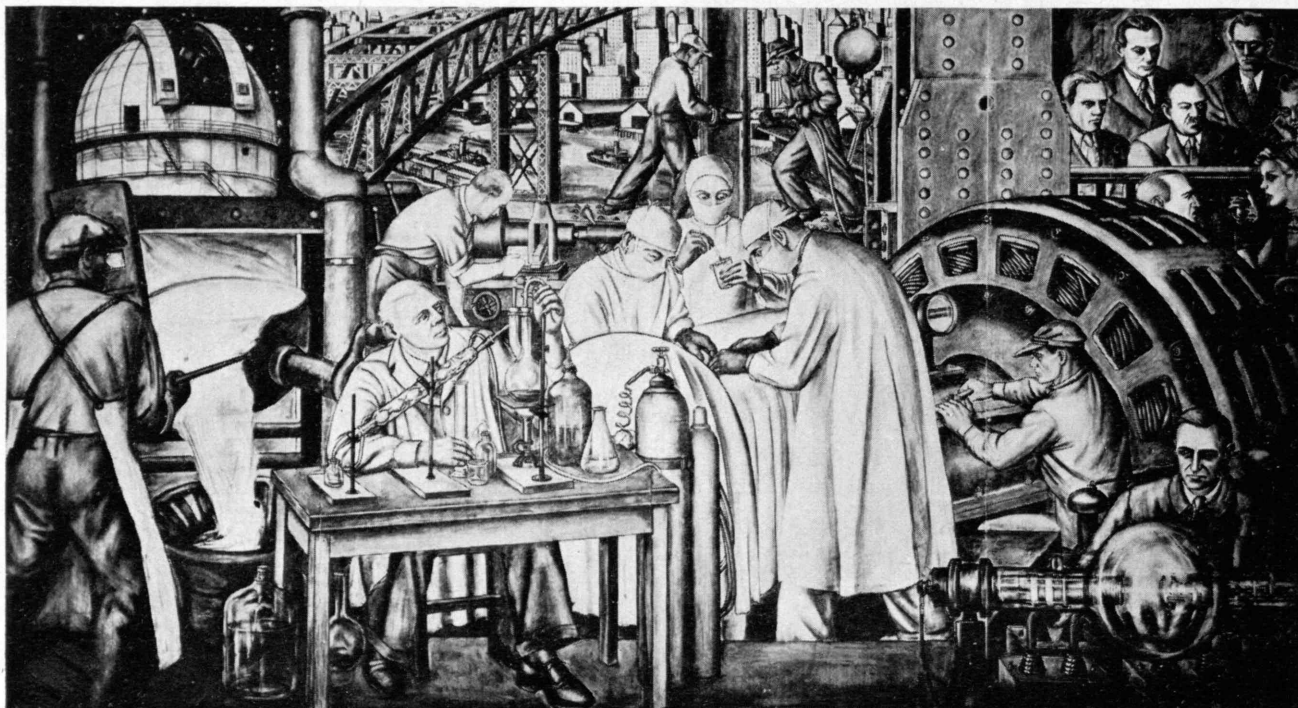
beset chemists in finding the relationships of the atoms in the sterols may be suggested by the molecular formula for cholesterol, $C_{27}H_{45}OH$.

In the long run, the researches of many chemists have shown that the architecture of sterol molecules comprises, as building blocks, units known as hydrogenated rings, which in turn bear side chains of carbon atoms and contain unsaturated (ethylenic) linkages. The completed picture (structural formula) of such a molecule is both fascinating and indispensable for the organic chemist. To him, the orderly pattern of symbols on the printed page epitomizes the accumulated knowledge about the compound and may suggest new investigations destined to probe deeply into problems of the growth and health of the living organism.

"That Men May Scan the Record of Each Flame"

BEFORE 1914 practically all the precise scientific instruments used in America were manufactured abroad. The War and subsequent high protective tariffs have in some degree changed the situation, but it remains true that in most fields the finest instruments must be obtained outside the country, and for a given standard of quality a given instrument is almost invariably cheaper abroad than in the United States. It is, therefore, gratifying to remember that one of the most exacting of all scientific instruments, the diffraction grating, has been practically an American monopoly since about 1870.

The history and present status of the diffraction grating were the subject of an unusually interesting symposium at the recent joint meeting of the American Physical Society and the Optical Society of America at



Cartoon for a panel of a mural, "the Evolution of Western Civilization," by Michael Newell. This mural won the Gold Medal of the New York Architectural League Exhibition this year

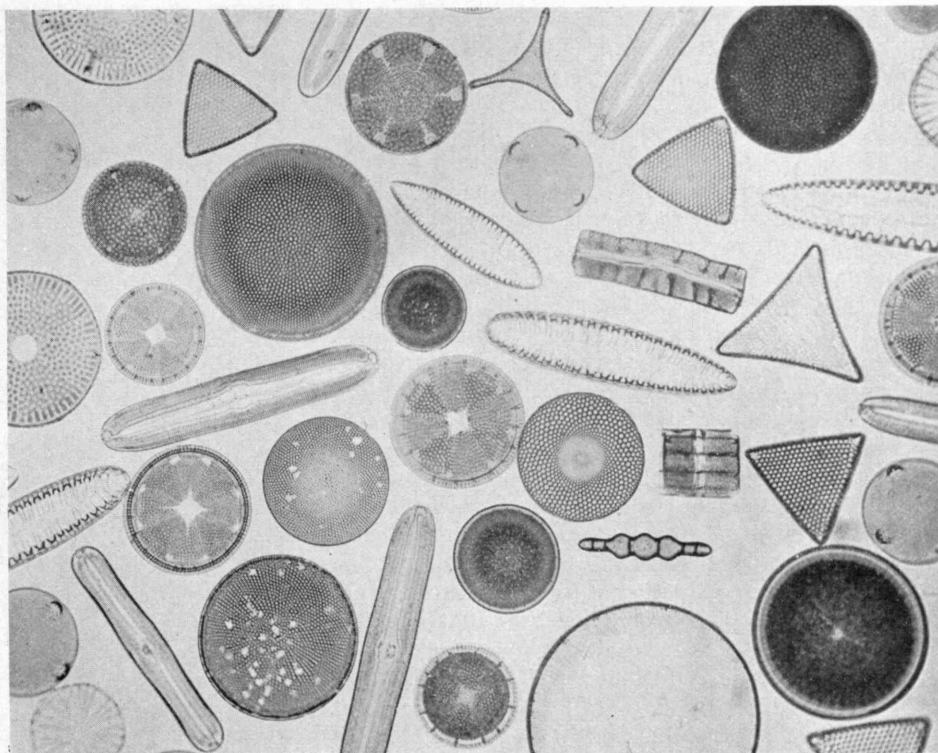
Federal Art Project, W.P.A., New York City

JEWELS OF THE PLANT WORLD

Diatoms, the microscopic plants whose beautifully sculptured shells of silicate form diatomaceous or infusorial earth. Each diatom is a single, independent cell which manufactures its own food by photosynthesis.

Most diatoms are aquatic, but some species can get along, as the proverbial Mississippi steamboats, wherever it is a little damp. When diatoms die their shells sink to the bottom of their watery habitation forming deposits such as those at Lompoc, Calif., where the beds, the largest known, are miles in extent and in places over 700 feet in thickness.

Latest use for diatomaceous earth: as an addition to cement to provide greater workability and strength. Other uses: to make mild abrasives, insulating materials, bacteriological filters, test objects for lenses



Microphotographed by Edward R. Schwarz, '23, for Marshall W. Jennison, '27

New York City. It was here reviewed that the more useful gratings consist of a block of glass or metal with an accurate plane, or cylindrical, concave face on which parallel lines, sometimes as many as 30,000 to the inch, have been ruled with a diamond point. These gratings are used in spectroscopy to separate a beam of light into its component parts. The effect is the same as that produced by a prism in the usual form of spectroscope, but a good grating is a much more satisfactory instrument for the purpose, especially for yellow or red light. Crude gratings have been made from fine parallel wires set close together. A wet umbrella on a dark night acts as a diffraction grating; lights viewed through it appear as bright spots from which rows and columns of miniature rainbows project.

Dr. K. K. Darrow of the Bell Telephone Laboratories discussed the history and early developments of the diffraction grating: Thomas Young, founder of the wave theory of light, was apparently the first to observe the production of colors by the diffraction of white light. He used one of the "exquisite micrometers of Mr. Coventry"—a rule scale. Von Fraunhofer, the German instrument maker who first observed line spectra, became interested in gratings and ruled some glass with 7,000 lines to the inch. He also made progress with the mathematical theory of the grating. Another German instrument maker, Nobert, became interested in gratings in connection with the development of microscopes. He ruled a grating with lines so closely spaced that his best microscope could not distinguish them; built a better microscope which could resolve these lines; built a finer grating, and so on. At present the microscope is ahead. About 1870 an American gentleman of means, Rutherford, made some very successful gratings with

17,300 lines to the inch. Serious production began when the late Professor Rowland built a ruling machine at Johns Hopkins University. His work has been continued by Professor R. W. Wood, also of Johns Hopkins, who was one of the speakers at the symposium.

Professor Wood and Professor Gale of the University of Chicago discussed the requirements of good gratings and the methods of manufacture. The lines cannot, of course, be ruled absolutely parallel or be evenly spaced. Small irregular fluctuations do relatively little harm, but any periodic deviation from regularity, such as might be caused by imperfections in the driving screw of the ruling machine, produce spurious spectral lines, called "ghosts," which become apparent when the grating is used. The construction of a ruling machine is, in principle, exactly that of the familiar machine-shop shaper: The tool, a diamond point, moves back and forth over the plate to be ruled and the plate is advanced the distance between lines at each stroke by a screw. The diamond point has to rule two or three hundred-thousand lines without resetting and must be light, yet not chatter. This creates a problem, but the screw which advances the carriage is the vital part of the apparatus. A special technique for lapping the screw in both directions with the nut which it later engages has been developed at Chicago, but no screw has ever been made sufficiently precise to be used without compensation by a specially calibrated cam. The friction of the carriage on its rails must be kept very small to avoid mass dislocation of the machine of magnitude sufficient to distort the rulings. At Chicago the main carriage is mounted with ball bearings on a subsidiary carriage moved by a screw which follows the main screw very closely. A marked improvement in the

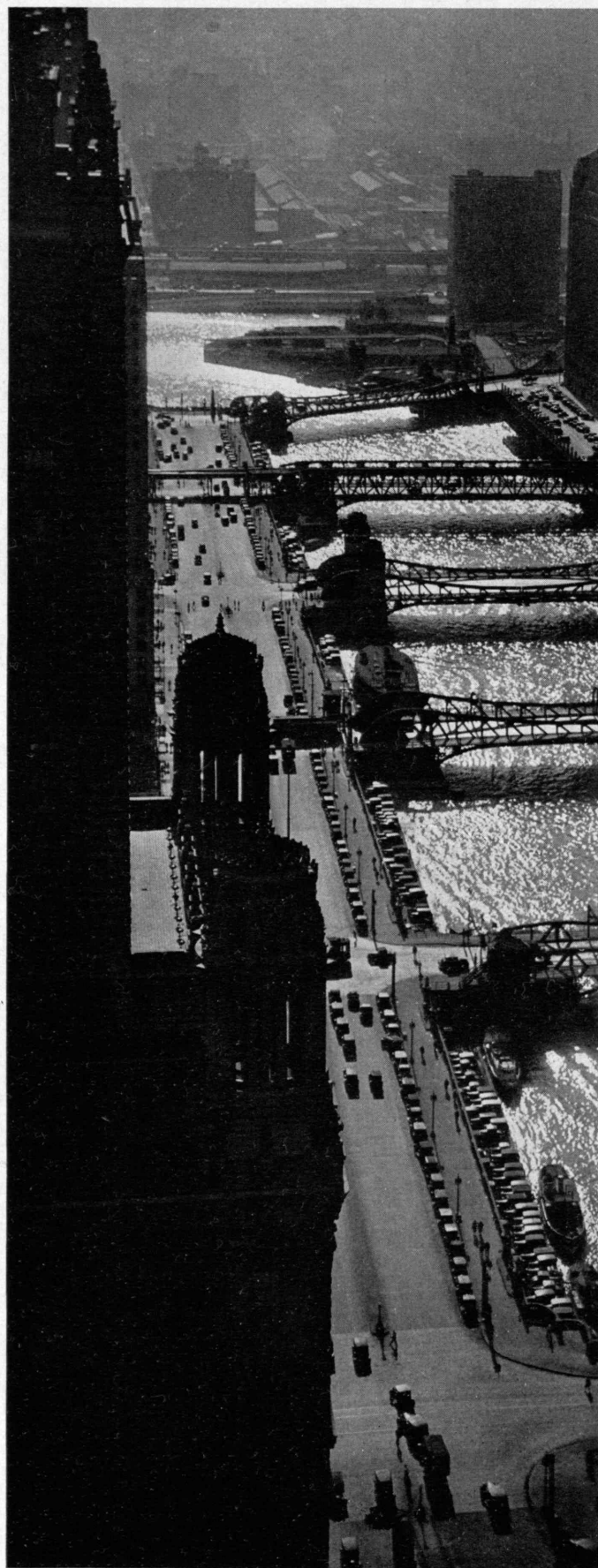
ruling has been the result. Of course the temperature of the room containing the machine has to be held within narrow limits, and it is impossible to rule except in the quietest locations.

Professor Gibbs of Cornell University discussed questions of supply and demand. He stated that gratings good enough for precise work in the visible part of the spectrum are ruled only at Johns Hopkins, Chicago, and Mount Wilson Observatory. Smaller gratings for special purposes are made at the University of Michigan, the Bureau of Standards, California Institute of Technology, the National Physics Laboratory in England, the University of Upsala in Sweden, and the University of Adelaide in Australia. The demand for good gratings far exceeds the supply, and they can be had only as an accommodation from the universities which rule them. The total number of first-class gratings ruled up to the present time is probably less than 600, of which some of the best are now in European laboratories. The spectroscopy laboratory of the M.I.T. has a particularly fine one. The probable production of first-class instruments for sale during the coming year is less than 40; the known demand is 183, and this does not include the demand for industrial laboratories, which may well exceed 100. It is understood that the firm of Zeiss in Germany considered going into the manufacture of gratings, but gave up the idea. Here is, then, an American industry, conducted along amateur lines, in which foreign instrument makers have been quite unable to compete.

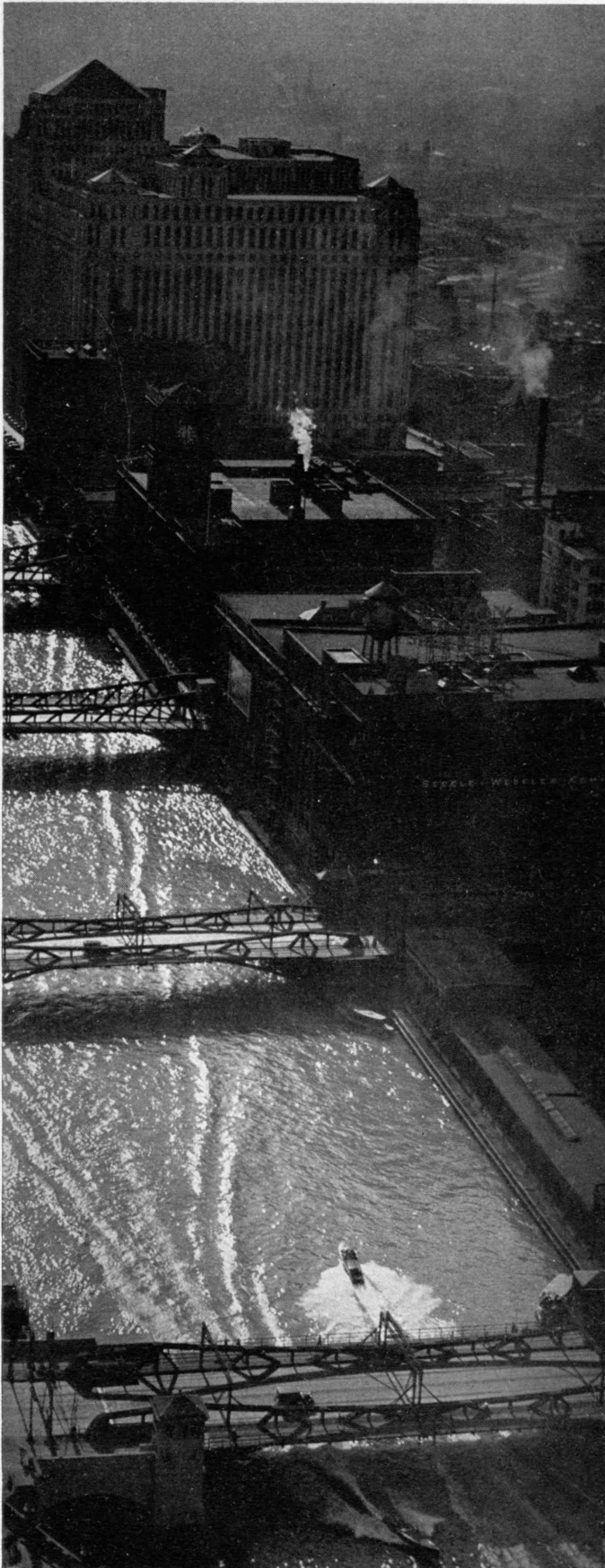
Photographs by Telephone

TWENTY years ago newspapers chartered ships or special trains and used airplanes to speed the distribution of important news photographs. Later, telephotography, the method of transmitting pictures by wire, was developed. Now, it is simply a matter of telephoning the picture as well as the news. Suppose, for example, that a tornado strikes a town, causing heavy damage and loss of life. The nearest newspaper immediately sends out a reporter and photographer who rush to the scene by automobile, train, or airplane. Photographs are taken and developed on the spot and both reporter and photographer hurry to the nearest telephone. There, by means of apparatus which can be carried in a suitcase, the photograph is transmitted to the newspaper office by an ordinary long-distance call. There are no special wires and no physical connections whatever between the sending apparatus and the telephone receiver. Ten, perhaps 15 minutes, complete the transmission and while the print is being made into an engraving for the presses the reporter dictates the story of the disaster. If the event is of national interest, the long-distance operators will plug in newspapers in all parts of the country and each will receive simultaneously a faithful reproduction of the photograph at the cost of a regular long-distance call.

Thus the telephone circuit, which already carries the greatest share of the world's burden of communication, is now used for the transmission of photographs. This new development, which comes just 60 years after Bell's first telephone conversation between Boston and Cambridge, is remarkable not only because it demon-



March of the bridges along Chicago River



Fairbanks from Kotling

In the distance the colossal Chicago Merchandise Mart

strates anew the versatility of the modern telephone system, but also because it makes possible the transmission of photographs simply and rapidly, whether it be from the home, the office, the corner drug store, or a remote farm house.

The instruments which make this advance in communication possible are the result of several years of intensive competitive research by newspapers and press associations to develop a cheap and swift method of distributing news photographs. The transmission of pictures by wire is not new, but up to the present time the process has required elaborate and very expensive apparatus, as well as special circuits and a staff of trained operators.

Telephotography as a daily service for newspapers began a little more than a year ago when the Associated Press announced the opening of its "wire-photo" system with stations at strategic points in various parts of the country. As this service is limited to members of the Associated Press, competitors immediately began an intensive search for new methods of transmitting photographs. The result is the development of four types of instruments capable of sending pictures over any telephone circuit by making a telephone call; all are highly compact and portable.

Wide World Photos, owned by the New York Times, has developed two types of transmitting and receiving apparatus. One is for use in newspaper offices; the other will be employed for transmitting from telephones near the scenes of news events. The office apparatus occupies a space only two by three by six feet, whereas the field set fits into a suitcase and weighs only 60 pounds. It operates on either ordinary lighting current or on an automobile storage battery. In transmission, a glossy print is secured on a small motor-driven drum which turns at a speed of 45 revolutions per minute. Rays from an exciter lamp are passed through a condensing lens and focused on the print. This light reflects back through an objective lens and passes through an aperture plate to a photoelectric cell, where it is combined with an 1,800-cycle signal, thus completing the modulating stage. The signal goes through an amplifier and is inductively applied to the ordinary telephone instrument. Operating at night rates, a six-and-one-half by eight-and-one-half print has been transmitted across the continent for less than \$25.

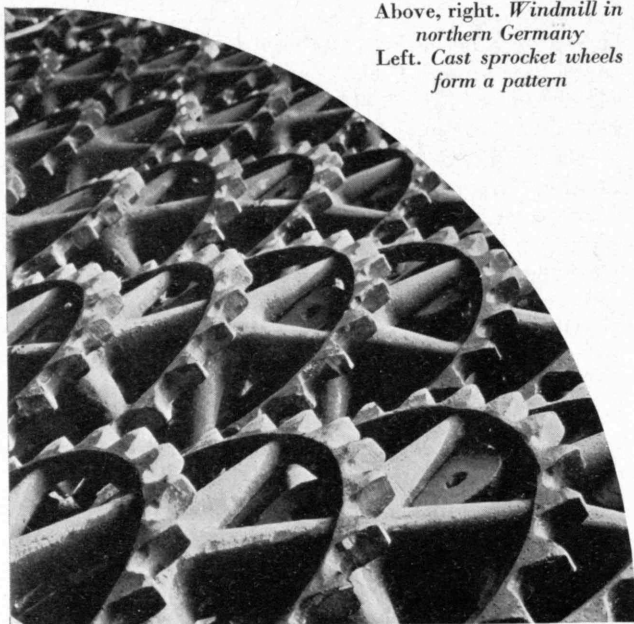
The induction method has been adopted for still another instrument designed in the laboratories of Newspaper Enterprise Association-Acme, Inc., the news picture subsidiary of the Scripps-Howard Newspapers. Utilizing a sound system which operates in much the same manner as the human voice, the laboratories of the Hearst interests have announced development of transmitting and receiving apparatus which will go into service between Chicago and New York, at once, and later will be used throughout the country. The light and dark areas on a picture transmitted by this method are controlled by variations in a sound beam.

The principle of the portable apparatus developed by the Associated Press has not yet been announced. Meanwhile pictures of another kind are in prospect as a result of plans of the American Telephone and Telegraph Company to build a coaxial cable from New York

to Philadelphia (see *The Review* for March, 1935). The new cable of revolutionary design will permit investigation of the possibilities of radio television, and, as a channel of communication, it is expected to carry at least 240 separate telephone conversations and perhaps 20 times as many telephone circuits simultaneously. In granting authority to construct the new cable, the Federal Communications Commission stipulated that it should be open for experimentation by radio companies interested in television transmission. The coaxial cable consists of a wire within a hollow tube; both wire and tube act as conductors, forming a coaxial pair capable of transmitting frequencies from zero to one million volts.

Earthless Gardens

THE possibility that the family of the future may grow its own vegetables in a corner of the basement, where plants will thrive luxuriantly without the aid of soil or the light and heat of the sun, is suggested by revolutionary horticultural research which has been going on quietly for several years. At the recent horticultural exhibition in New York, Dr. John M. Arthur of the Boyce Thompson Institute showed a new type of greenhouse in which plants several times their normal size were growing in glass pots containing only a solution of certain minerals, salts, and other plant foods. Carefully controlled artificial light and heat completed their requirements, and the plants developed two or three times faster than under natural conditions. A gardenia plant growing in a dark basement under the light of a sodium-vapor lamp for two weeks produced dozens of sweetly scented flowers of unusual beauty. Dr. P. W. Zimmerman, who with Dr. A. E. Hitchcock this year won the \$1,000 prize of the American Association for the Advancement of Science for their study of plant growth at the Boyce Thompson Institute, suggested that in the future explorers will be able to grow their own tomatoes and peas in the polar regions.



Above, right. Windmill in northern Germany
Left. Cast sprocket wheels form a pattern

This remarkable achievement kindles the imagination. It clearly suggests astonishing changes in the economic status of agriculture as it is measured today, and the significance of what this change may mean is best indicated by two striking examples cited by Dr. L. V. Burton, editor of *Food Industries*, in a recent address. He described a horticultural method in which plants rest on sawdust or some similar material with their roots extending downward through a wire screen into



Roberts

a solution containing the necessary plant foods. In one box about the size of an ordinary desk was a potato plant which had grown to a height of five feet. The crop of potatoes it produced filled the sawdust on which the giant plant rested and it was estimated that this plant alone would yield between five and eight bushels. Considered in terms of nutriment, boiled, mashed, or fried, the possibilities of one or two potato plants in the basement are reassuring.

Still more astonishing was Dr. Burton's account of a tomato plant with a stalk three inches in diameter. From its bed of sawdust it had climbed a frame 10 feet high and then hung down to the floor, laden with hundreds of tomatoes of excellent quality and flavor. This colossal climber was estimated to be producing at the rate of 700 tons an acre per year. In view of the fact that tomato growers consider five tons to the acre a fair average yield, the potentialities of the new artificial method staggers the imagination.

Whether this amazing advance in horticulture can be justified economically is a question that only further investigation can answer. Aside from the cost of the chemicals necessary for plant growth, an abundant supply of cheap electricity would appear to be of fundamental importance. What then would become of the farmer who now supplies our needs? There is no answer for the moment, but Dr. Burton suggests that the truck gardens of the future may be greenhouses or stores, conveniently located in the cities where consumers will

buy their vegetables, and possibly fruits, fresh from the growing plants or trees. This alone would eliminate the tremendous annual loss from the spoilage of produce in the stores of today. Large families, he thinks, may have compact, highly productive gardens in their basements. All this presages the day when mothers will say: "Quick, Tommy, run to the basement and pick the tomatoes; our guests are about to arrive!"

Highway Makers

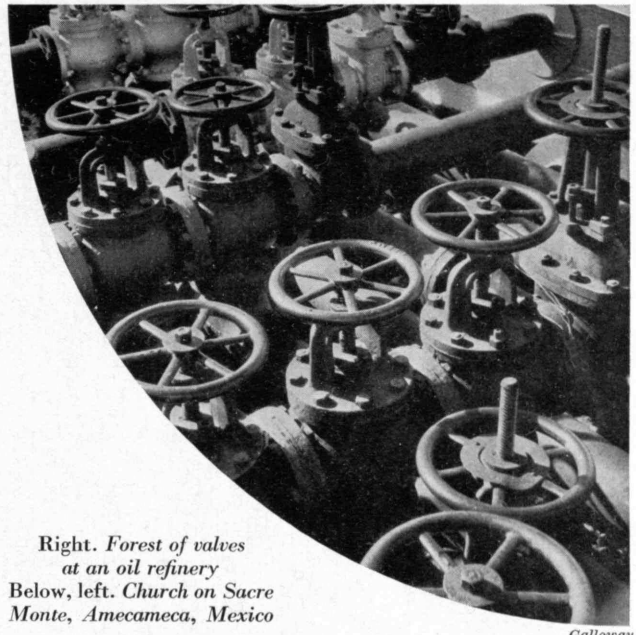
MOST of us who use the products of the road builders have scant idea of the far-reaching improvements that have come about in road-building machinery. Asked to list the essential elements for highway construction, the average intelligent citizen would be hard put to it to get beyond steam shovels, graders, and steam rollers. As we curse a slight delay on an eastern project or are pulled out of a Wyoming ditch by the very patrol that put us there, we have scant time to notice, much less examine, the elaboration of mechanism that has taken place since a steam shovel was just a steam shovel and a steam roller only an enlarged tennis-court roller. The 1936 Road Show held in Cleveland early this year would, to any casual visitor, have been a glimpse into the unknown.

That show had a great many implications. In the first place, it was the first serious show since 1933, the



Frederick B. Wolf, '28

road builders having given up altogether during the years when work had to be done by hand for the one reason that there were so many hands to do it. In the second place, although in pure size it was only about half as big as the 1930 show in Atlantic City, there were many more interesting exhibits of new developments and much serious buying. Moreover, the show marked the return to exhibitions of heavy equipment which had begun to disappear at St. Louis in 1931 and were as dead as dodos by the 1933 Detroit performance.

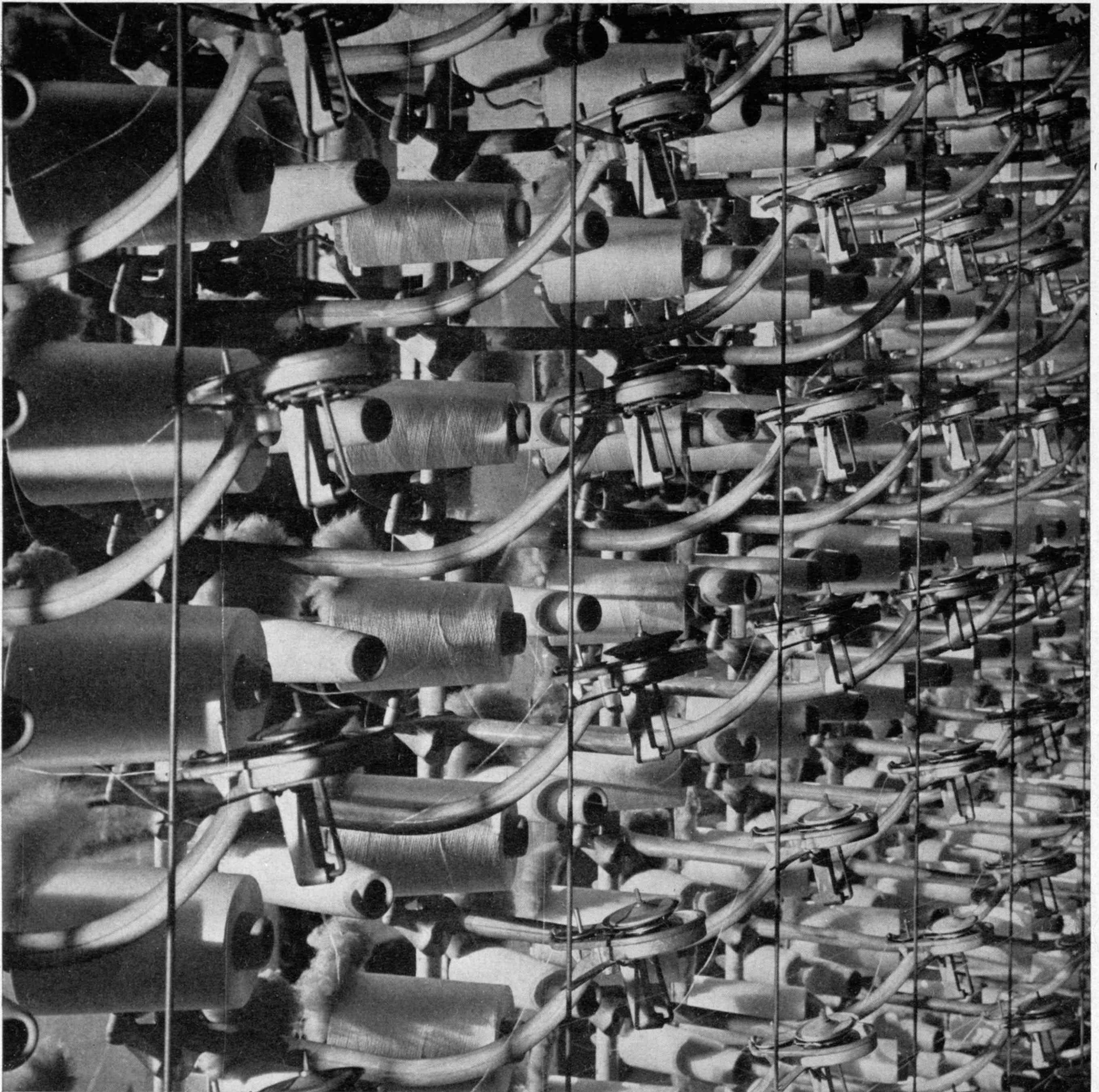


Right. Forest of valves
at an oil refinery
Below, left. Church on Sacre
Monte, Amecameca, Mexico

Galloway

Reasons for this fresh breath of air blowing across the highway-equipment business are several. One is, of course, the obvious though slow recrudescence of the capital-goods business in general. Another is the conclusion, reached after months and months of experiment, that even on works relief projects morale and output are vastly increased by adding some machinery, because the men feel that they are then engaged in real construction instead of boondoggling. The show offered a fair conclusion that the highway-making industry has at its disposal an amazing number of new and profitable gadgets, that it begins to face the future unafraid, that these same gadgets because of their higher degree of mechanization are going to demand a higher degree of management in the future.

The trends in the actual machinery reveal pretty clearly the trends in highways themselves. The greater accuracy of pavement-laying apparatus, for example, is a direct result of more rigid specifications, specifications often calling for 5,000 pounds compressive strength in concrete, for bituminous surfaces that measure to level within one-eighth inch in ten feet. Stronger, smoother, and more level materials are in turn a direct demand of increased weight and speed of traffic, imposing greater wear which can be met only by such specifications. Dirt-moving equipment gets bigger and faster, principally because of the tendency to move more and more yardage for every mile built. In addition, many of the larger and more flexible pieces of apparatus are the result of western conditions which, because of sparse settlement, require a contractor to work over a much wider area and because of the pioneering nature of many of the roads require more trail blazing. Another western factor of considerable importance is the amount of mountain road building that has been and will continue to be done. Finally, concrete apparatus on the whole shows less improvement than bituminous, principally because there is a very definite tendency towards low-cost work and the building of secondary highway systems which in the past have suffered neglect.



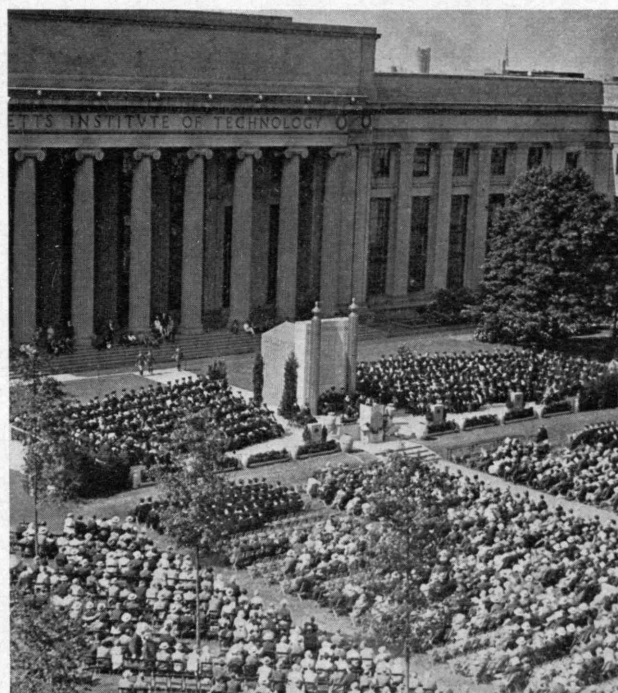
Silk reel in a textile mill

Courtesy, New Jersey Zinc Co.

If the show be any guide, there has been more recent thinking about machinery than about new materials. About the only brand-new thing in materials that turned up was a triangular cast-iron paving block, 12 inches on a side and resting on pedestals at the corners. Considerable attention was paid, however, to the problem of stabilizing dirt for roads and subgrades by the addition of such various things as deliquescent salts, bitumen, Portland cement; the aim in each case being to maintain a moisture equilibrium and hence a binding quality in the clays used for such purposes.

Other clearly defined trends were toward heavy-treaded rubber tires, often as big as 18 inches by 24 inches, replacing the erstwhile popular caterpillar type of traction, toward more specialized machinery for

individual types of operation, together with a tendency to combine several of these in one unit, toward fast and large-capacity units particularly for earth moving, resulting in power scrapers with a capacity of 24 cubic yards and power-dumped moving apparatus with a capacity of 30 cubic yards. There were marked developments in mechanical quality, performance, distribution of weight, appearance, and durability. On the score of durability, one manufacturer states that his paving machine of today is in better condition and will have fewer breakdowns after 100 miles of 20-foot pavement than it had five years ago after 30 to 40 miles of 18-foot road. Another definite trend is toward hydraulic controls, although one or two leading units still stick to their cables. Streamlining raised (*Continued on page 304*)



*Inauguration of
President Compton
in the Great Court at
M.I.T. on June 6,
1930*

Whither Bound?

A Forecast of Technological Education on the Occasion of the Institute's Diamond Anniversary

BY KARL T. COMPTON

With Illustrations of Events and Scenes in the History of M.I.T.

AS a form of intellectual effort, forecasting is more notable for its ability to survive failures than for its successes. It flourished with the soothsayers of Egypt and the oracles of Greece; it lost none of its vogue in the hands of the astrologers of the Middle Ages; it is practiced today by tipsters, weather prophets, investment counselors, and a host of similar services.

Wishful thinking and the fact that "hope springs eternal in the human breast" account in part for the hold that forecasters have on us, as does also the human frailty of trying to shift responsibility for making decisions. More fundamental, however, is the fact that almost every rational action has to be based upon some sort of forecast of its future results. Rational human beings, therefore, must of necessity be forecasters.

The progress of civilization may be measured by the trend from superstition to science in forecasting, but this trend has been immensely more rapid in some fields than others. Astronomers can predict an eclipse with stop-watch accuracy

a century in advance; psychologists have made at least some progress in ability to forecast probable success in different occupations by measuring students' aptitudes; medical men are as yet powerless to foretell when or where the next epidemic of infantile paralysis will break

out. All grades of forecasting, from hocus-pocus and racket to art and science, coexist as part of man's struggle for a more satisfying life.

Having thus defined the field and exposed the uncertainties of forecasting, I immediately confess that my present excursion into this realm lies somewhere in the scale between racket and science, at about the point usually described as "hunch." My logic may be faulty or unforeseen conditions may arise to change the picture, but, as I see it, technological education in the future will show the following characteristics:

1. The importance of technological education will continually increase. This appears to be the sure result of three factors: first, the increasing competition which is forced upon individuals and organizations as the opportunity for free



At the dedication of the present M.I.T. buildings, 20 years ago. Left to right: Senator Henry Cabot Lodge, Governor Samuel McCall, President Richard C. Maclaurin (all now deceased), and Edwin S. Webster, '88

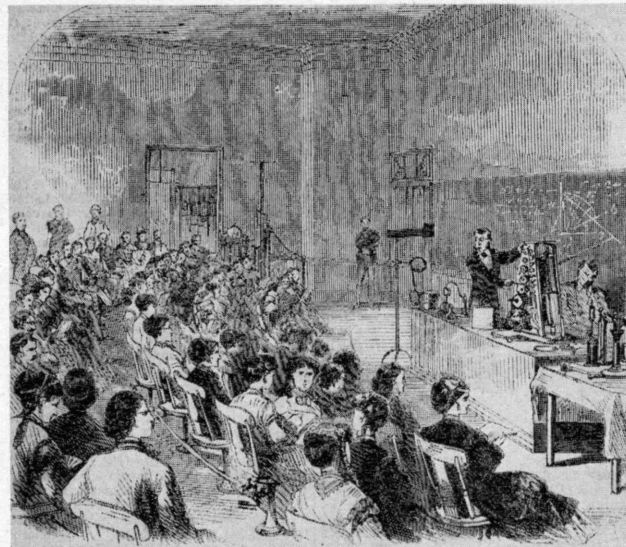
expansion into the unoccupied frontiers of the West disappears; second, the necessity of using and husbanding our natural resources more wisely as these become less and less available for easy and wasteful exploitation; third, the increasing applications of science to minister to human needs and desires, which are so important a feature of our so-called rising standard of living.

2. There will be increasing differentiation between technological and technical training, *i.e.*, between the engineering school and the trade school. The field is rapidly becoming too complex to be included in one and the same curriculum, and the school which attempts to straddle both will succeed in neither.

3. Large industrial units or associations will increasingly establish their own trade schools to train expert technicians for their own special purposes. Private or public technical schools will similarly supply the general needs of the surrounding industrial communities for skilled mechanics, lithographers, textile workers, elec-

competition or achieved voluntarily after wise appraisal of opportunities. Most of our present colleges were founded in the era of horse and buggy or limited rail transportation. Most of them were intended to minister to local educational needs. As transportation becomes faster and easier, and the people become more travel minded, why should an ambitious young man try to secure a specialized training for a profession at Podunk College, when a few hours of travel will give him the superior education of a great institution?

Obviously this tendency is more pronounced in the higher grades of the educational system, such as the professional and graduate schools. We will, therefore, see many a smaller or less favorably situated institution drop its ambitious attempts to encompass the whole field of education and concentrate its resources to do the best possible job as an undergraduate or a junior college, perhaps retaining some special field of local significance. At the same time, the higher ranges of



Left. The geological museum. Right. The physical lecture room. These interior views of the Institute's Rogers Building were engraved in 1869

tricians, draughtsmen, and the like. This system will practically replace the older apprentice system which for better or worse, is rapidly disappearing.

4. Undergraduate curriculums in technological schools will increasingly avoid specialization except in rather general fields, and will devote increasing attention to physics, chemistry, and the general principles and methods of engineering, with supplementary education in social science and training in the art of exposition. Such broad and basic training is needed to give the vision and adaptability required for positions of responsibility in a world of activities which are increasingly dependent on applications of science in new and varied ways.

5. As a corollary, the increasing need for many technological specialists will be met by the graduate curriculums, and we may expect a continuation of the recently growing emphasis on graduate study.

6. We will see increasing differentiation in scope and more logical adaptation to environment in our colleges and universities. This will be forced upon them by

education will be concentrated in the most favorably situated institutions. Even among these, the selective process will operate, and we will see a few of them emerge as superprofessional schools, with the graduate aspect strongly emphasized.

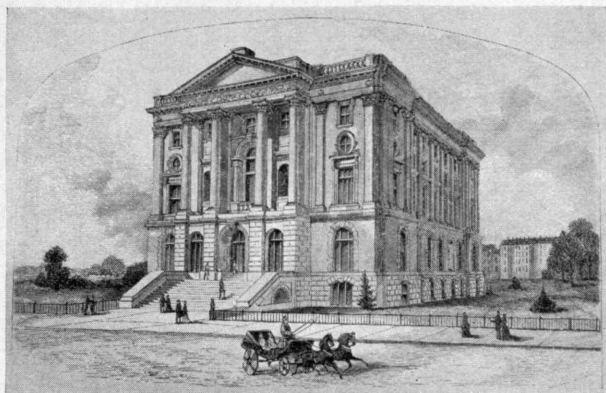
7. Research will become a continually more important activity in the leading technological schools. Two important factors conspire to bring this about, one pedagogical and the other social.

As to the first of these, it will suffice to remark that research, *viz.*, investigation and report of some problem conducted intensively and relatively independently by a student, aided by all the resources of library, laboratory, and consultation which he can marshal, supplies a test and training for an important element of his future career, which are not afforded by ordinary classroom or laboratory methods of instruction. Research, as for graduation theses, is a more expensive type of training than lecture, quiz, and laboratory exercise; it is far more difficult to handle properly by the faculty, but if so handled it is likely to be fascinating to the student. I



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The Rogers Building in 1865

believe research to be capable of great development as a feature of education, both graduate and undergraduate, and those schools which are able to handle it adequately will take a predominating place in the educational world.

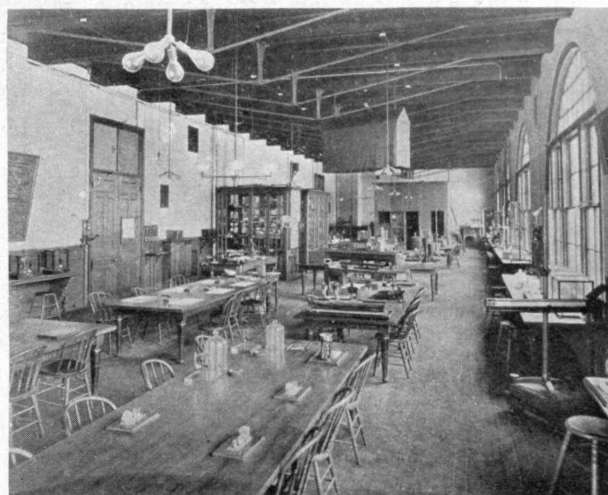
The social basis for research in educational institutions lies in the combination of urgent public need for research and unique opportunities for performing some kinds of research in educational institutions. Such institutions have extensive and varied laboratory equipment, large staffs in many related fields of science and art, and a great supply of young men available as students or apprentices to work under expert guidance. There is thus a dovetailing of interests and facilities between education and research, which is mutually most favorable.

Public welfare calls for research from a multitude of angles; new developments in industry, public health, agriculture, and all technical fields depend on progress in pure science and development of new materials, processes, and methods. While industrial organizations can profitably conduct research on problems related to their specific interests, and governmental agencies can properly undertake research in specific fields of wide public interest, none of these is justified or equipped, as are the educational institutions, to engage in the general advancement of knowledge on which all depend in the last analysis.

For such reasons I look for an increased activity in research in the technological schools and for their support by the public in this activity. Such support will come in a variety of ways: by gifts from public spirited benefactors; by contracts from industrial associations for investigation and report on fundamental or obscure problems of general interest to the associations; by grants directly by the government in support of important scientific programs. The first of these is one of the finest outgrowths of the American capitalistic system; the last two are logical ways in which the benefits of research, specifically rather unpredictable but of unquestioned value in the aggregate, may be supported by the group for the general good. Recent practices of certain governmental bureaus and provisions in Congressional bills indicate a strong trend toward recognition of research in educational institutions — even outside the land-grant group — as a proper and desirable expenditure of public money.



An evening chemistry class of the Lowell Institute in the laboratory of M.I.T., 1869. Reproduced from the supplement to Frank Leslie's Illustrated Newspaper, December 18, 1869. The professor in the left foreground is Charles W. Eliot, who later became president of Harvard. "On winter evenings," noted Leslie's, "these rooms present a scene of unusual interest, for it is then that female students are given the use of the apparatus"



Above. General Laboratory of Physics, Walker Building. Below. The first Rogers Laboratory of Physics. Designed by Professor Edward C. Pickering, it constituted the first laboratory for instruction in physics. It was located in what is now the exhibition room of the School of Architecture (Rogers Building)

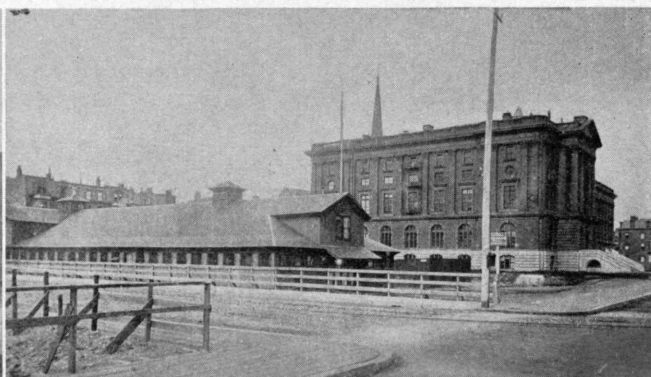
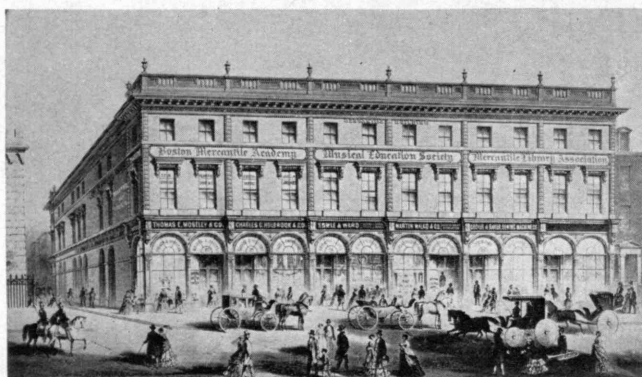


8. Finally comes the question: "Will increasing taxation and other methods of forcibly distributing wealth so cripple private philanthropy in this country as to sound the death knell of the privately supported educational institutions, leaving all education in the hands of the State?" Inflation and taxation in an essentially socialistic state could accomplish this. If it should happen, education would be a major loser in the general catastrophe. Fully admitting the splendid work of many state-supported universities, and their essential contribution to our national life, it is, nevertheless, the independent institutions which have set the pace and maintained the intellectual integrity and freedom of our entire educational system. Lose them, and the whole structure is freely exposed to the danger of political manipulation and domination.

Private institutions can pay their key men salaries larger than those of the average voter or political office holder, can undertake intellectual projects of no obvious practical value, can report facts or announce theories without thought of the political strife of the moment. Such things are not so easy in a state-controlled school, and would be vastly less easy if the bulwark of tradition and example of the private institutions were destroyed. State institutions suffer under still other handicaps: It is easier to get appropriations for buildings, which show,

than for the staff, which really makes the institution; the institutions tend to become pawns in the game of taxation and budgets, with the staffs playing the rôle of very nervous onlookers and the presidents forced to mingle lobbying with educational administration; the pressure to expand activities and serve all groups works against concentration on essentials and maintenance of high standards. Elimination of independent educational institutions would, therefore, not only sacrifice educational leadership, but would enormously increase the difficulties in spite of which the state institutions are now performing their functions so splendidly.

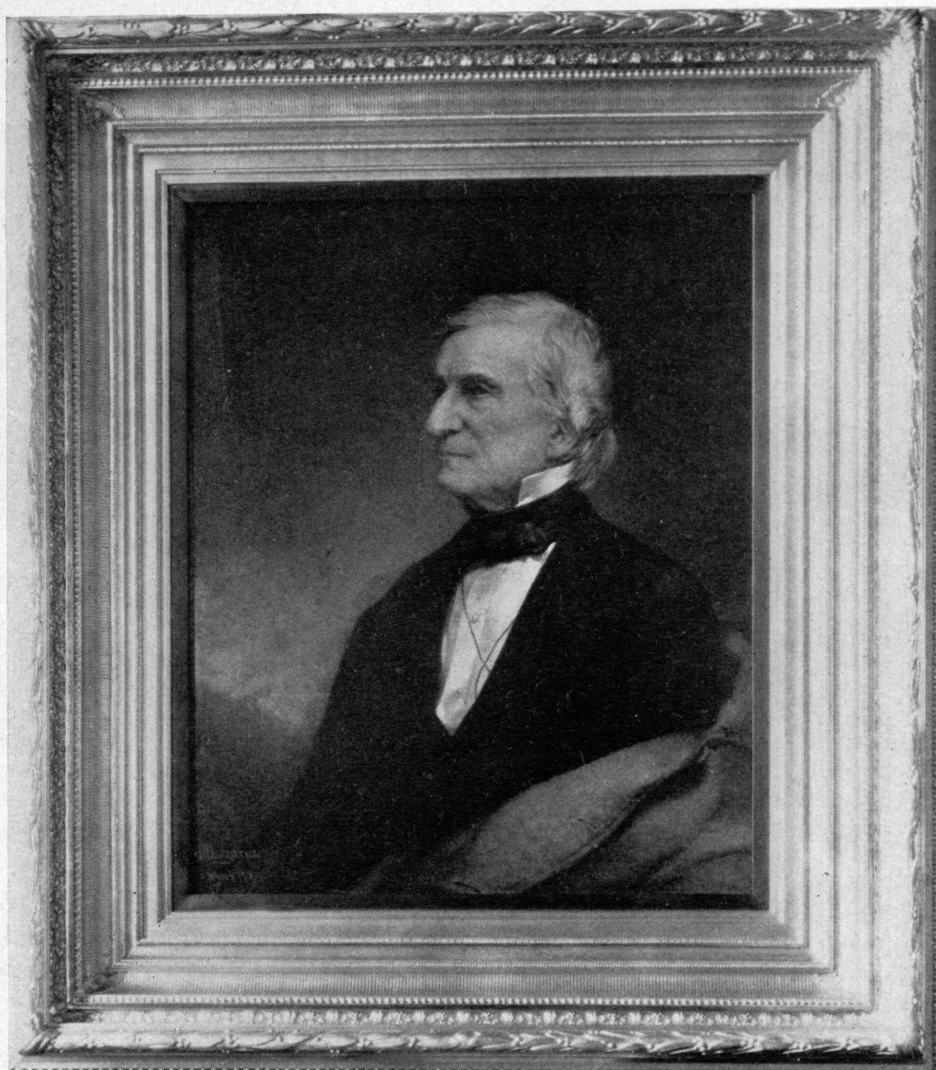
I do not believe that the basic good sense of the American people will permit these things to happen. I believe that our tradition of freedom, initiative, and individual rights will continue to develop men and women who will acquire wealth and who will wish to use it for outstanding benefits to the general social group, in which education is an important element. I do believe that the economic trends are making the path of the private institutions more difficult and that some of them will succumb. The trend, I believe, will be for state institutions to assume more of the burden of ordinary education, expanding from the public-school field into the junior-college field, thus substituting education in place of unemployment. (*Concluded on page 322*)



CHILDHOOD SCENES

Above, left. Mercantile Building, Summer Street, Boston, where M.I.T. began instruction on February 20, 1865. In his diary of that date William Barton Rogers wrote: "Organized the school; 15 students entered; may this not prove a memorable day." Above, right. Gymnasium (where old Walker now stands) and the Rogers Building from Clarendon Street. Below, left. Walker Building, now rented by Boston University. Below, right. Engineering A and B and the Pierce Building from Dartmouth Street





William Barton Rogers (1804 to 1882), Founder of the Institute, its president from 1862 to 1870 and from 1878 to 1881, distinguished geologist, advocate of scientific education

Technology Revisited

*Thoughts Suggested to a Liberal Arts College Graduate by the
Celebration of the Seventy-Fifth Anniversary of the M.I.T.*

BY TREADWELL CLEVELAND

IF, as the saying goes, institutions are personalities projected, then the Massachusetts Institute of Technology of today, 75 years after the granting of its charter, is a most impressive instance. The very design and structure of its present home, to say nothing of its informing spirit, may be viewed as the natural efflorescence of the Founder's dream. In the course of the Institute's growth and development other personalities, in the same tradition, have entered to advance and accomplish the historic result honored at this Diamond Jubilee.

In the beginning, William Barton Rogers, brilliant and beloved pioneer of research and of technical education, was able, broadly, to anticipate by a century the

place and influence which pure and applied sciences were to win for themselves in America, not only in practical fields but in the wider domain of general culture as well. His imagination began to labor with the vision at least as early as 1846, and his genius not only assured the founding, but in "scope and plan," laid a firm foundation for permanence. Then, after the first hard and almost defeated years, followed Francis Amasa Walker, builder and tireless champion, under whose leadership the Institute, educationally, may be said to have come into its own. Distinguished soldier, master of statistical method, and historic as administrator of the Federal Census, an original and influential economist, a great teacher — General Walker, through the charm and



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Davis

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Davis

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5

MacDonald

6

TECHNOLOGY

2. John Daniel Runkle (1870 to 1878), acting President, 1868 to 1870; 3. Francis Amasa Walker (1881 to 1897); 4. James Mason Crafts (1897 to 1900); 5. Henry Smith Pritchett (1900 to 1907); 6. Arthur Amos Noyes, acting President (1907 to 1909),

force of his personality and his indefatigable energy, made new friends for the Institute in every direction and drew students in redoubled numbers to its doors. Still, the financial base of the new school was insecure and its housing, fragmentary and inadequate. The administration of Richard C. Maclaurin covered the most thrilling period of Technology history, for it so capitalized Technology achievement that a flood of funds was drawn to the school and the doors of the future were flung wide open. It was in the course of reaping this financial harvest, well earned as it was, that the Alumni, loyal and generous from the start, were energized to unprecedented efforts, crowned with glowing success. Maclaurin thus became the establisher. Of these three men, Rogers, Walker, Maclaurin, it may be said literally that they gave the last full measure of devotion to the Institute ideal: They died in its service. To them, as leaders, we chiefly owe this great seat of science, in which we take national pride.

The fitness and beauty of this architectural group, whose dedication was an event of international import 20 years ago this year, symbolize alike, as we shall see, the utilitarian and the spiritual values which the Founder so prophetically and so justly appraised. The incomparable site, fronting upon the Charles River, supplies a most appropriate setting for what may now be seen to have been a unique adventure of the intellect. This present Technology, moreover, is in more ways than one the direct product of Institute inspiration. These buildings were planned and built by Institute architects and engineers.

YET there is another and a still more vital sense in which the M.I.T. of today may properly be said to have been self-engendered: There went forth from Technology, even in its humbler years, a stream of graduates whose sound training and dependable integrity were to make their Alma Mater known and honored in

high places. It was the ability and character of these graduates which made possible the newer Technology of this anniversary, with all its outward attractiveness and adequacy, its thoroughness, its performance, its aspiring endeavor, and its unbounded promise.

Consider a controlling instance — the steps that established contacts with George Eastman and led straight to Eastman's investment of almost 20 millions of dollars in this institution in which Technology standards had taught him to believe. In the Department of Mechanical Engineering, in 1890, was Darragh de Lancey, a senior near graduation. One day Gaetano Lanza, Head of the Department, handed him a letter, saying, casually enough: "You can answer that if it interests you."

The letter was from Eastman. De Lancey answered it, and two months later he began working for Eastman at Rochester, where he presently became head of the mechanical and electrical divisions. In January, 1892, he was made works manager, in charge of all operations at Kodak Park. Except for Francis S. Viele, '91, and a laboratory assistant, de Lancey was the only technical man on the job until 1896. In that year, needing a chemical engineer, he turned to Technology, which recommended Frank W. Lovejoy, '94. After an interview in Boston, de Lancey engaged Lovejoy, who joined the Eastman forces in January, 1897. Mr. Eastman's official biography indicates that it was through Lovejoy, now president of the company, that Maclaurin and Eastman arranged a meeting. Immediately thereafter Eastman's munificence began with a gift of \$2,500,000 for building. The chain of contacts was complete: de Lancey and Lovejoy had proved to have been the soundest of investments for the Institute no less than for Eastman.

Technology Alumni, as individuals, as groups, or through their Association, have demonstrated their faith in Technology ideals and their loyalty to the

Studies by Paul Nefflin for the decorative frieze in Huntington Hall, Rogers Building. This building, the Institute's first, now houses the School of Architecture





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PRESIDENTS

7. Richard C. Maclaurin (1909 to 1920); 8. Elihu Thomson, acting President (March 10, 1920, to June 30, 1921, and November 10 1921, to January, 1923); 9. E. F. Nichols (January 4, 1921, to 1922); 10. S. W. Stratton (1923 to 1930); 11. Karl T. Compton, (1930 to present)

Institute by unflinching financial response to needs. Toward the \$750,000 paid for the present site of 50 acres, one Alumnus contributed \$500,000. The President's residence is the gift of two Alumni. The Walker Memorial and three dormitories are examples of Alumni appreciation and generosity. Furthermore, in meeting the condition attached to Eastman's greatest single gift the Alumni rose as a body to the challenge and raised \$4,000,000 among themselves and industry.

As members of their Association, the Alumni have maintained in recent years two representatives on each of the Institute's departmental visiting committees. These men have contributed by bringing to the Institute the points of view and the experience they have gained since graduation, and by helping steadily to relate the work of the Institute to the changing life of the day. Advisory councils of Alumni keep in touch with every student activity, encouraging and promoting them all. Local alumni associations and clubs, throughout this country, its territories and dependencies, and also in foreign countries, are centers of effective Alumni spirit and participate in the affairs and objectives of the Institute. One of the most important and growing services of the Alumni is in aiding the discovery and selection of especially promising students.

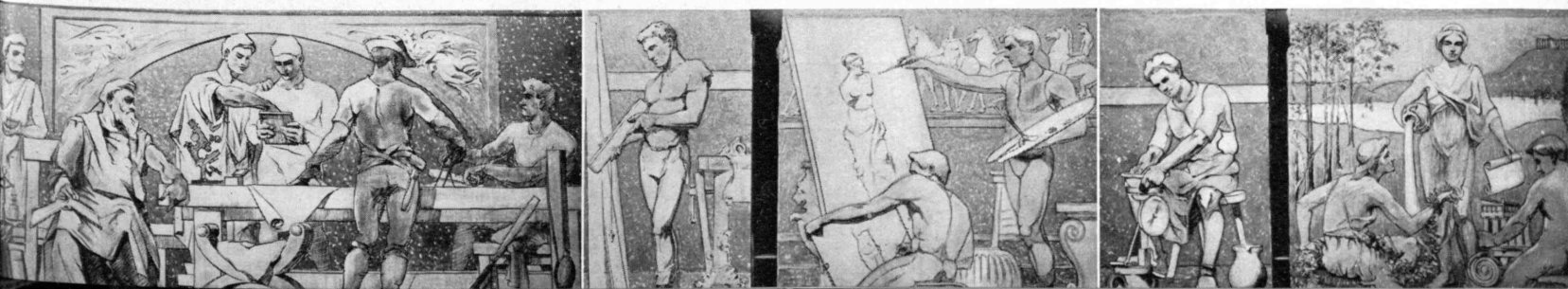
This Alumni pride in the Alma Mater is, indeed, responsible for the continuance of the M.I.T. as an individual school. In spite of inducements that were, no doubt, persuasive enough, the Alumni resisted the movement which would have merged the Institute with Harvard, and their resistance was decisive. Feeling on both sides ran high in those days; but none, it is believed, would now deny that Technology has since amply vindicated its right to separate existence, or that sentiment, in this instance, deserved to prevail.

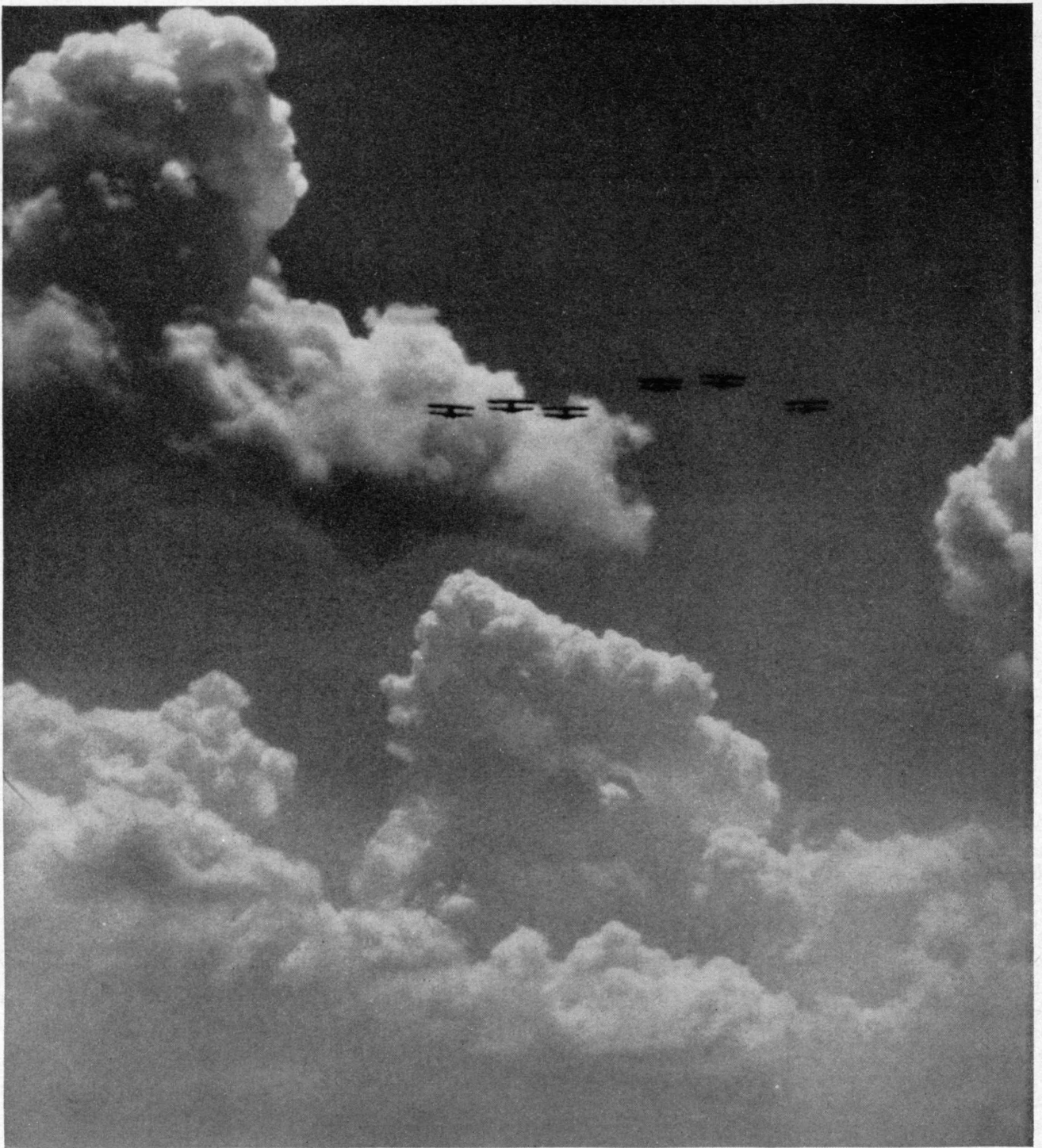
Meantime, Technology graduates, by hundreds, were entering every field of applied science, of the arts, of pure science. They became heads of research labora-

tories; executives in industrial, building, transport, power enterprises of foremost rank; heads of important banking and investment institutions; professors in charge of departments at universities; college presidents; public servants for cities, states, and the nation. They permeated the new technological America then in the making and made their rich contributions to practically every domain of private and public activity. For example: Every vessel now in the United States Navy was designed and built under the supervision of holders of Technology degrees; a dozen schools of architecture are headed by Technology architectural graduates; the president of the Society of American Etchers is a Technology graduate — so is the president of the General Electric Company, and the president of General Motors; a Technology man helped to perfect the telephone; a Technology man has been one of the foremost designers of yachts; the honorary director of the Mount Wilson Observatory is a Technology man. Technology men include the secretary of the Smithsonian Institution, the director of the Peabody Museum at Yale, the co-developers of the Technicolor film process, the builders and designers of the Boston and Brooklyn supply bases (in War time), and the president of the National Safety Council.

The presidents of the Goodyear Tire Company, of the Babson Statistical Organization, of Stone and Webster, of the Central Railroad of New Jersey, of the United Fruit Company, of the Winchester Repeating Arms Company, all are Technology graduates. In the fields of banking and investment, Technology men are presidents of the First National Bank of Boston, of the Equitable Trust Company, of the Guaranty Trust, of Hayden Stone, of the First Boston Corporation, of the American International Corporation, and of the Bank of America. A Technology man made the first nonstop flight to Hawaii; the procurement experts of both Army and Navy aviation, the (Continued on page 290)

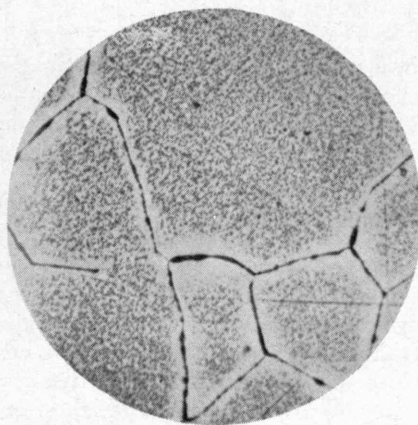
William Barton Rogers' love of beauty gained concrete expression in the Rogers Building. It was he who commissioned Nefflin to execute this frieze





Patrol

FROM A PHOTOGRAPH BY W. C. WEST, '11



New magnetic technique for studying the corrosion properties of alloys. Colloidal iron oxide was used in taking this picture showing the location of the magnetic components in an alloy steel. The black lines illustrate the magnetic nature of the grain boundaries. The region within the grains is only slightly magnetic. Photographed by Russell C. Buehl and John C. G. Wulff

Wolf's Clothing

How We Are Learning about the Protective Skins of Metals

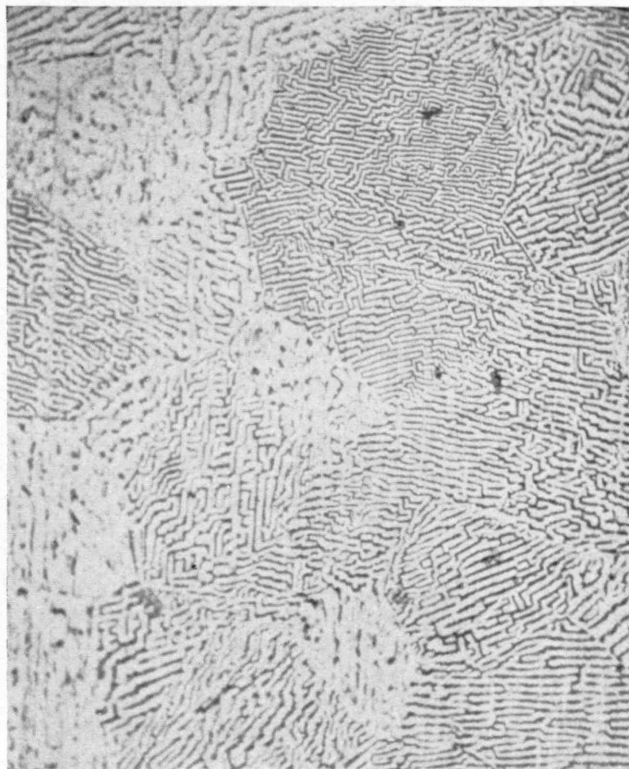
BY PHILIP M. MORSE

DESPITE the old fable, a sheep in wolf's clothing may be a quite desirable animal, combining the tractability of the sheep with the protection of the horrendous outer covering. Physicists are learning that the metals we use are quite similar animals: A metal without its skin is a most delicate creature, easily harmed, but with its thin, protective film intact, it can withstand the blows and acid baths of a hostile world.

We all know that a thin film of paint or tin can keep a piece of iron unharmed for years, whereas it would otherwise rust away; we know that heat treatment can give a piece of steel a tough, resistant coat; we know some of the more obvious facts about the properties of metal surfaces, but we are just beginning to learn the intricate whys and wherefores of these properties. We are finding out the why of a lubricant, for instance; learning that an oil molecule is a leechlike creature with a long, flexible tail. The molecule is not cannibalistic (it does not cling tightly to other oil molecules), but it does have a decided hankering for metals. Consequently the outer layers of a film of oil on a metal can be rubbed off easily: The molecules away from the metal are piled up helter-skelter and have no particular desire to remain together. But the molecules next to the surface of the metal are all headed inward, with their jaws clamped tight: even the molecules a molecular distance from the metal are headed in, trying to get a bite. These last few layers, therefore, present a very different picture from the rest of the oil: They cling so tightly that it is often necessary to tear loose the first layers of the metal to remove the oil. A good lubricant, therefore, is one which has molecules with long bodies and very strong jaws.

Oxygen is another very clinging substance — in fact, it may be the oxygen on one end of the oil molecule which provides the oil with jaws. Oxygen by itself has not a body long enough to lubricate the surface; but a thin layer of oxygen, two or three atoms thick, properly laid on, is an excellent protection from corrosion.

The properties of this layer are shown by some experiments performed by Professor John Wulff here at Technology. When a piece of ordinary iron is used as a cathode for a low-pressure electric discharge in argon gas its surface is gradually purified to a depth of about 30 atoms. When this piece is taken from the vacuum



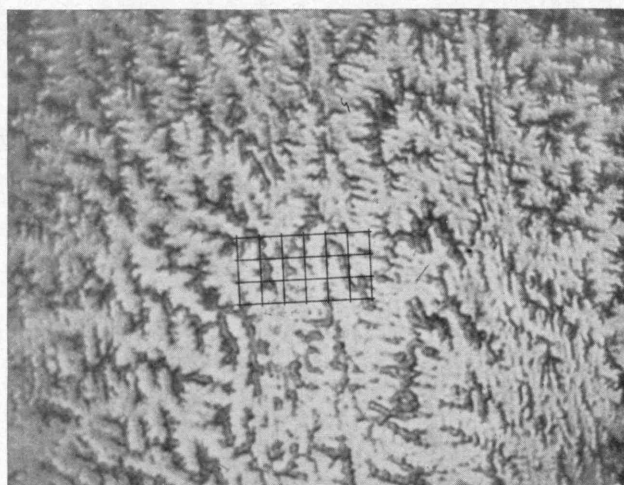
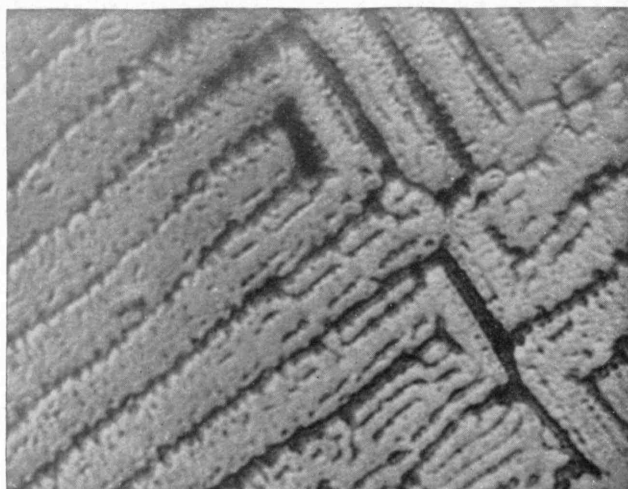
Magnetic aids to seeing. Magnetic structure in the grains of silicon steel. Note the difference in the regularity of the structure within the different grains. This structure, and even the grain structure, is invisible by ordinary microscopic observation. Photographed by Dr. W. C. Elmore of the Department of Physics. Magnification 70 times

tube, it looks more like silver than like iron and is extremely resistant to corrosion. Two weeks contact with water and air leaves the surface still silvery. If a scratch is made across its face, however, corrosion immediately starts and the whole surface turns rusty overnight. This effect is at least partly due to the state of the oxygen layer on the surface of the iron.

All metals in contact with air have an oxygen layer clinging to them. Metals which have not been vacuum treated have oxygen also beneath the surface, so that the first few atom layers of the metal are really mixtures of oxygen and metal. This hybrid surface seems to be more susceptible to corrosion than is a surface where all the oxygen is on the outside. Bombardment of the electric discharge presumably clears away the internal oxygen, leaving pure metal. When a piece so treated is

we intend to discuss some of the methods recently developed for studying surface phenomena, for as yet the few results obtained by these methods are not so interesting as the possibilities they hold for important discoveries in the near future. These new methods are essentially only different ways of looking at surfaces, with modern physics providing a set of new spectacles with which to do the looking. Each pair of spectacles shows us a different aspect of the material and provides us with different facts which we hope eventually to piece together into a complete picture. Through them we are able to see those first few layers of atoms on the metal — layers which often save the surface, thereby saving all!

The most obvious way to see a surface is to shine light on it. We have already mentioned the correlation between the state of the oxygen on the surface and the



Details of magnetic structure inside the grains of alloys. The regular structure is typical of silicon steel, the irregular, typical of permalloy. Photographed by Dr. W. C. Elmore. Magnification 600 times

brought into the air, the oxygen clings tightly to the surface, but does not penetrate, and thus makes a tough skin which successfully resists corrosion.

The difference between internal oxygen and surface oxygen is more clearly brought out in another series of experiments performed by Professor Wulff in connection with his search for the best material with which to coat large telescope mirrors. It is well known that aluminum films make excellent reflecting surfaces, if the aluminum is properly applied. When put on in the air, so that oxygen is trapped within the metal, the reflectivity of the resulting film is only 60%; when the aluminum is applied by evaporation in a vacuum, the resulting film reflects as much as 85% or 90% of the incident light and remains untarnished for several years. Oxygen is present on this latter surface, but it is solely *on* the surface, not inside. It seems that a pure oxygen layer on top of a pure metal protects the surface and is transparent enough to allow most of the light to be reflected. Only when the oxygen is caught inside the surface is the reflectivity diminished and the resistance to corrosion reduced.

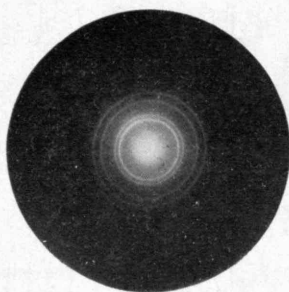
NEW WAYS FOR SEEING METALS

We did not set out to discuss the many current theories of surface phenomena or to present a bewildering inventory of properties already measured. Instead,

amount of light reflected. The behavior of ultraviolet light is especially significant because the shorter waves are sensitive to finer details. Some difficulty has been encountered until recently in ultraviolet measurements due to the fact that the glass prisms required to separate the ultraviolet from the visible light are nearly opaque to the ultraviolet. In the past two years, however, Professor Stockbarger, '19, at Technology has developed methods for producing large crystals of lithium fluoride suitable for making prisms. Lithium fluoride is transparent to the ultraviolet and is as efficient as glass in separating out visible light. Thus, measurements can now be made which were hitherto impossible. Many of these measurements must be made in a vacuum, for the air itself is opaque to very short-wave ultraviolet light.

It often happens, however, that metal surfaces look uniform by reflected light, yet are quite nonuniform in their other properties. Therefore to this test we add a magnetic one. Professor A. V. deForest, '11, has, for some time, been studying the magnetic irregularities in a metal surface, which are due to fatigue or to casting imperfections, by dusting magnetic powder on the surface. Recently, however, Dr. W. C. Elmore, now at Technology working with Professor Bitter, has enlarged this method to include microscopic study. He spreads a colloidal suspension of magnetic material over the

Electron diffraction picture obtained by shooting electrons through a thin film of gold. Photographed by Dr. G. Morton



surface to be examined, places it in a magnetic field, and looks at it with a microscope. Details which were previously invisible become apparent; the boundaries of the metal grains show clearly; and regular structure appears within each grain. Some of Dr. Elmore's pictures are reproduced on these pages. The details are completely invisible under ordinary microscopic observation.

A similar magnetic method has been applied by Wulff and Buehl to study the relation between magnetic irregularities and the corrosion properties of alloy steels. Such steels usually consist of myriads of small grains cemented together by material differing somewhat in constitution from that of the grains. The cementing material often is the weakest part of the alloy steel. Sometimes it corrodes away entirely, the metal crumbling into a pile of uncorroded grains. In some cases the corrosion properties of the cement seem to be connected with its magnetic properties. Even when an alloy steel has been treated so that the intergranular cement resists corrosion, the surface may still be subject to "pit corrosion." The whole surface may be corrosion proof except for a few small patches which corrode rapidly and eventually pit the surface badly. The pits are often associated with strongly magnetic patches at or near the surface.

Of course it is important to learn about the actual structure of the surface: whether it is crystalline with a regular arrangement of atoms, or whether it is amorphous. X-rays have been used to study the structure of the interior of metals, but x-rays are of no great help in studying surface films, for they penetrate beyond the layer in question. Here the methods of electron diffraction come to our aid. Eight years ago the experiments of Davisson and Germer at the Bell Telephone Laboratories gave a direct proof of the wave-like nature of the electron. They showed that under proper conditions these electron waves could be made to show interference patterns similar to those of x-rays. These patterns could be analyzed to determine the structure of the material which reflected them just as the x-ray patterns have been used since the classic work of the Braggs. The important feature for us is that the electrons do not penetrate deeply into the material and so can be made to tell us the structure of the surface rather than that of the interior. The analysis of the resulting pattern is somewhat more difficult to make, but in the hands of an expert much can be learned. The change in the surface structure due to the heat treatment

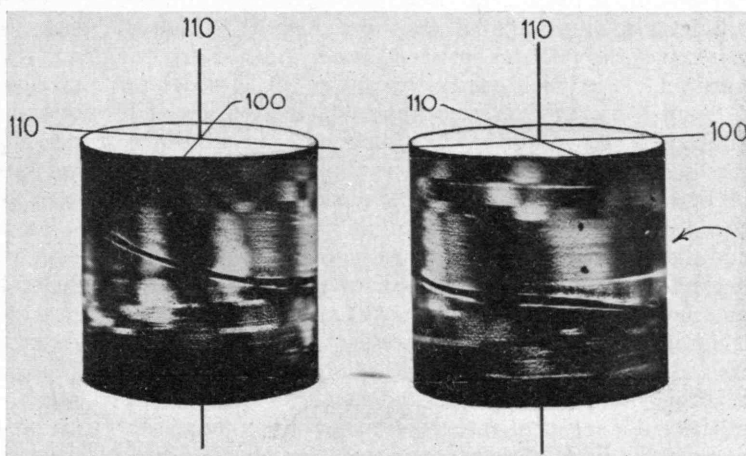
of a metal can be learned and the effect of polishing on the breaking down of grain structure can be watched. Much can be discovered about the behavior of paints and other protective films.

Work was begun last year at Technology under Professor B. E. Warren, '24, on the study of surface structure by electron diffraction. Some of the properties of linseed oil films, of great importance in the study of paints, were studied. Workers in England have been discovering interesting properties of oil films on metals, helping us solve the problems of lubrication.

So far we have been talking about the mechanical and corrosion properties of surfaces. Other properties are also important: Of immediate practical interest, now that vacuum tubes have become a household necessity, is the understanding of the evaporation of electrons from a surface. Every metal has a skin which hinders the escape of the myriads of electrons within it. Some metals, such as caesium and potassium, have very weak skins, but we cannot use them for filaments because they melt before they can be heated sufficiently to evaporate many electrons. Tungsten can be raised to a high temperature, but it has a very tough hide. A good filament can be made by coating tungsten with caesium; it is, therefore, important to know how this can be done and when it will be successful.

THE ELECTRON MICROSCOPE

The electron microscope has been developed to help us answer these questions. It enables us to see directly the electron-emitting properties of a metal. Electrons, evaporated from the surface, are focussed by electric fields to form an image of the surface in much the same manner as light rays are focussed by lenses to form the image in an ordinary microscope. One of the simplest of these electron microscopes has been developed by R. P. Johnson here at Technology and is of immediate use in studying the emission properties of filaments. A straight filament is placed in the center of a cylindrical evacuated tube. A radial electric field (Continued on page 312)



Two pictures, by electron emission, of a polished tungsten filament partially covered by caesium, taken from two different directions. The filament consists of one large crystal, shown by the arrow, and several smaller ones with slightly shifted axes. The axes shown are for the large crystal. The bright patches are where caesium covers the surface, allowing large emission. The symmetry of the patches, corresponding to the crystal symmetry, is shown. Pictures made by R. P. Johnson and W. Shockley of the Institute's Department of Physics

Style vs. Safety

Safer Automobiles Can Be Built!

BY DEAN A. FALES

DEATHS resulting from motor-car accidents in this country last year reached an all-time high, with 36,400 persons killed. This is at the rate of 100 deaths a day for every day in the year but one. This total is twice as high as that in 1923. Such figures demand action; they prompt many questions. Especially, of course, they point the query whether a safer automobile can be built. Indeed, that question is forced to the front and it calls for an honest answer. This honest answer is: "Yes, certainly; a safer automobile *can* be built."

Some may doubt this — so many so-called safety features have been added in recent models. However, safety has not been the only consideration in their design and construction; style has been largely influential. New styles appeal to the eye; they promise increased comfort; they provide more power, greater smoothness and flexibility in operation, greater speed in "going places." Cars are air conditioned and streamlined in accordance with current slogans; they flatter the pride of luxury by their exclusiveness and distinction; they are in the mode — while the mode lasts; but they are not so safe as they could be and should be.

To account for this dominance of style, with the dangers it involves, we do not need to go to the engineers and the manufacturers. We need look only as far as the advertising counselors and pictorial artists, whose business it is to invent sales arguments, talking points, buyer appeal. Sound engineering, based upon safety requirements first of all, would have given us other styles — styles which in human terms would be more worth while because they would be safer.

Safety involves, first of all, the car itself; secondly, it involves the relation between the car and the driver. Any vehicle in good condition can be considered safe if handled by a driver who knows its capabilities and limitations and who drives accordingly. Many of the new cars hide their limitations from the driver, however, because they are so much faster and smoother to handle that the driver is deceived as to his speed, and both he and the car are unable to cope with an emergency when it comes. Several years ago a manufacturer produced a new model which was more powerful and much smoother than the previous model. The accident rate immediately trebled. It is true, also, of another make, that because it is this year so much faster and smoother than former models, its accident rate is growing in an alarming manner. In both cases the cars were structurally safe, but the drivers were operating the new cars at speeds far in excess of those possible in the old models and were getting into difficulties as a result.

Reserve power to be called upon intelligently and properly when needed is a safety factor; it enables quick passing and quick acceleration and gives the driver

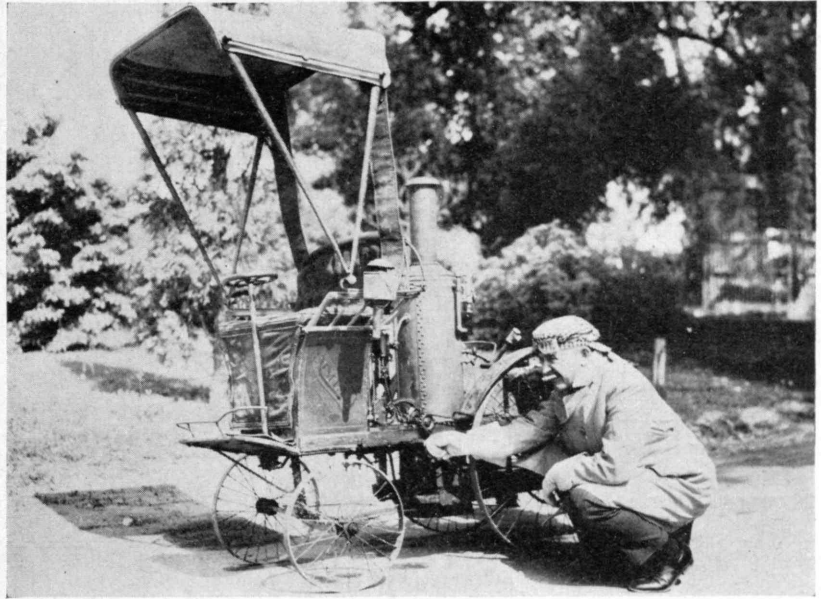
better control. Yet reserve power is also a menace, because it encourages driving at unsafe speeds. To prevent excessive speeds, it has been proposed to put governors on cars, holding them down to a maximum of 50 miles an hour. That plan is dangerous; a man trying to pass an unwilling driver would be unable to make the required speed; the two drivers would find themselves traveling side by side watching each other instead of the traffic. One idea of merit is to build a switch into the speedometer, which can be set to sound a buzzer at any predetermined speed. This sound would warn the driver, but would not interfere with his control; he could increase speed as he can now if necessary, but would know what he was about. If governors are to be adopted at all, it would be well to fix the limit for each car at its safe maximum speed. Some older cars become unmanageable at 50 miles an hour, whereas a few of the new cars can almost double that speed with comparative safety.

Power plants have been developed to a point that enables speeds far in excess of the road-holding, steering, and braking of the cars in which they are installed. Some coupés and runabouts can reach speeds at which they become directionally unstable and tend to wander on the road; the slightest bump or cross wind can throw them out of control. No car can be driven safely at high speeds in gusty cross winds.

Safety in the foregoing examples depends in part upon the relationship between the car and the driver. Let us turn now to danger spots that are strictly due to car construction or design. Exhaust systems must be made more rugged and must be better protected. Crank-case ventilator fumes must be disposed of in such a way that they cannot enter the body of the car. The marine practice of drawing crank-case fumes into the intake and providing exhaust systems that last for long periods without leaking could well be copied in motor vehicles. Higher ground clearance would eliminate much damage to exhaust systems.

The weight distribution that has been adopted for easy riding often makes road holding faulty, steering sluggish, braking erratic, and traction poor. This dangerous condition should be conquered by better weight distribution, even with the sacrifice of some comfort. Demand for comfort, again, has resulted in putting too much emphasis upon low-pressure tires and too little on the spring suspensions. When rounding corners, low-pressure permits the camber to change dangerously, and, on the driving wheels, the driving radius changes to a large degree on bumpy roads. With tires, the controlling thought should be to give them the best possible road-holding and tractive qualities; spring suspension should be depended upon for riding comfort. Tires have been developed to high standards,

SEVEN MILES PER HOUR!
Barney Oldfield stops a squeak
in Frenchman Archille Phil-
on's handsome, streamlined
steam car — one of the progen-
itors of the modern automobile



Fairbanks

but unless they are properly inflated and are replaced when worn, they offer one of the greatest hazards to safe driving. Caster, camber, and toe-in of the front wheels must be controlled under all conditions, and although many mechanical layouts are such as to do their full part in maintaining control, if tires, because of low pressure or faulty inflation, fold under on corners, they counteract the good of the mechanical layout. The use of accurate tire gauges should be made compulsory.

Demand for ease of operation has resulted in sluggish steering ratios. With present ratios it is impossible to correct a quick skid, and the driver has no "feel" of his car. These ratios make control in deep sand, snow, or mud difficult; the front wheels cannot be turned quickly enough to keep the car headed in the desired direction. If the thought of safety had been uppermost, such ratios would not have been adopted.

Tests have shown that carbon monoxide in harmful quantities has been present in some of the older cars. In cars with vacuum ventilating systems which draw dust and fumes into the bodies, danger from this cause may be expected to increase. Pressure ventilating systems can be developed, which, besides eliminating this hazard from poisonous gases, could serve as heating and windshield-defrosting systems. Ample heat is available, because, for every horsepower used to propel the car, about twice as much power is wasted.

Braking systems have been improved, but by no means enough. For example, with the car weight forward, high-speed braking is in some cases only 60% as effective as on cars which have power plants placed back of the front axle. In general, braking should be so distributed as to apply most effectively at the point to which the weight of the car is shifted. To develop braking systems which will so operate would doubtless be expensive, but such development is practicable. The added safety would justify the cost.

Low ground clearances and long overhanging rear structures cause many vulnerable parts of the vehicle to be damaged on rough roads and on ramps. Higher

ground clearances would not only prevent damage to exhaust systems, steering mechanisms, power plants, and so on, but could also contribute to easy riding by allowing the springs greater movement.

We may now return to a consideration of those elements in present car styles which indirectly reduce safety by adversely affecting the drivers of the cars. If the driver is to handle the present high-speed car properly it is plain that he must, at all times, be alert. Fatigue destroys alertness, and the present styles are creating additional causes of fatigue. An investigation of all such causes made by properly qualified experts would lead to recommendations that might be used as standards of safety. Such an investigation should cover: driving-seat positions, adjustments, and cushions; control positions, adjustments, and effort required to operate; minimum areas of vision (front, sides, and rear), windshield wipers and mirrors; ventilation, windshield defrosting, and heating; allowable amount of noise and vibration, and so on.

The present trend in low bodies is largely style. In European racing cars, which are driven at 200 miles an hour on existing roads, the drivers reconcile themselves to the handicap of greatly increased frontal area so that they may sit erect and high enough to secure the proper driving vision. Driving seats should place the driver in a comfortable, alert position. The controls should be conveniently and naturally placed. The driver should be able to see out under all conditions; his eyes should be protected from reflections and glare; his surroundings should be properly ventilated and heated. No annoying vibrations should be tolerated. The new-style bodies have great rigidity but in many cases their construction causes drumming which in time wears upon the riders and tends to deaden the mental alertness of the driver. That which in a short ride may be only a minor annoyance often becomes a major hazard on a long trip. Driving seats, besides holding the driver in an alert position, should have comfortable upholstery and should be adjustable fore (Continued on page 302)

THE INSTITUTE GAZETTE

PREPARED IN COLLABORATION WITH THE TECHNOLOGY NEWS SERVICE

To New Achievements

William B. Rogers, James M. Beebe, E. S. Tobey, S. H. Gookin, E. B. Bigelow, M. D. Ross, J. D. Philbrick, F. H. Storer, J. D. Runkle, C. H. Dalton, J. B. Francis, I. C. Hoadley, M. P. Wilder, C. L. Flint, Thomas Rice, John Chase, J. P. Robinson, F. W. Lincoln, Jr., Thomas Aspinwall, J. A. Dupee, E. C. Cabot, their associates and successors, are hereby made a body corporate, by the name of the Massachusetts Institute of Technology, for the purpose of instituting and maintaining a society of arts, a museum of arts, and a school of industrial science, and aiding generally, by suitable means, the advancement, development, and practical application of science in connection with arts, agriculture, manufactures, and commerce; with all the powers and privileges, and subject to all the duties, restrictions, and liabilities, set forth in the sixty-eighth chapter of the General Statutes. . . .

WITH this farsighted, comprehensive statement of purpose began the "Act to Incorporate the M.I.T." dated April 10, 1861. The Review, in celebrating in this issue the diamond anniversary of the approval of this act, reviews the growth and accomplishments of Technology and extrapolates its curve of progress into the immediate future.

What promise this future holds! As we contemplate the resourcefulness, energy, and spirit which pervade the Institute community today we cannot fail to conclude that it is being led, under the direction of its honored President and Vice-President, "to opportunities, to achievements, to new traditions, far greater, far richer, far more full of promise than even those we today so proudly and gratefully commemorate."*

Alumni Festival

FEELING that this anniversary year calls for a memorable and whole-hearted demonstration of Technology spirit, the Alumni plan, for their annual Alumni Day, a special program of jubilation and festivity on June 8. If the immediate and favorable response to the reunion questionnaire which accompanied President Compton's recent letter to Alumni is any indication, Alumni Day, 1936, will be notable in the annals of Technology fellowship. Already over 1,000 have expressed their intention to be present.

Recognition

THE Lamme Medal, presented annually for the past six years by the American Institute of Electrical Engineers for meritorious achievement in the development of electrical apparatus or machinery, will be awarded this year to Dr. Vannevar Bush, '16, Vice-President of

*The concluding words of the tender and inspiring farewell to Rogers Building delivered by the late James P. Munroe, '82, 20 years ago when the Institute moved to Cambridge.

the Institute and Dean of the School of Engineering. Dr. Bush will receive the medal, which has been given him for his development of methods and devices for application of mathematical analysis to the problems of electrical engineering, at the annual summer convention of the organization in Pasadena, Calif., in June.

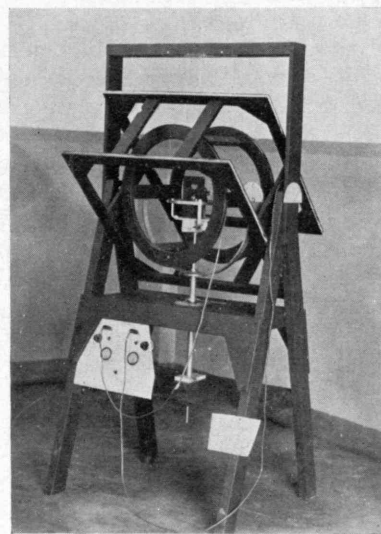
The medal, one of the highest honors in electrical engineering, was presented last year to a distinguished Technology graduate, Henry Ellis Warren, '94, President of the Warren Telechron Company of Ashland, Mass.

The fund for the award was established by a bequest of the late Benjamin G. Lamme, Chief Engineer of the Westinghouse Electric and Manufacturing Company.

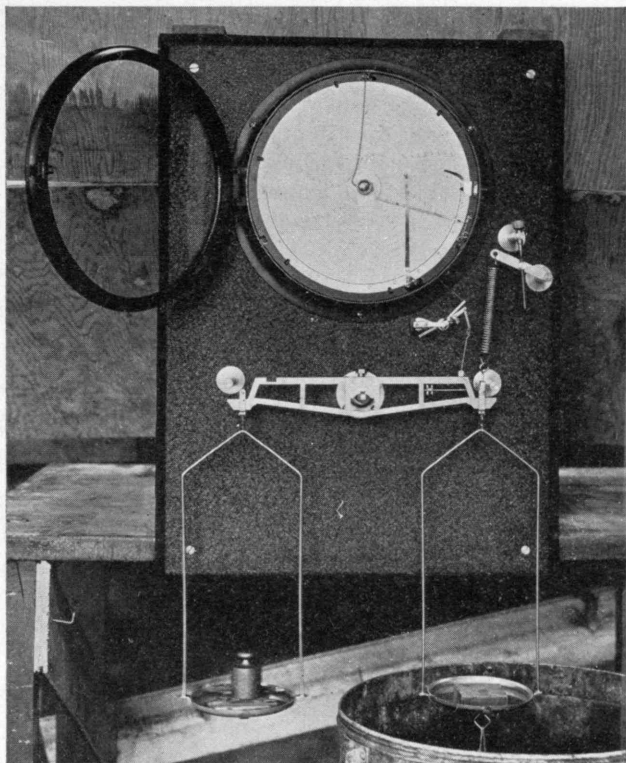
Foiling Jupe Pluvius

A PIN-HOLE in an umbrella is a cocklebur to the temper on a rainy day. Equally nettling to building owners are rivulets of water which trickle through crevices at mortar joints in masonry walls. Such separation of brick and mortar construction causes damp, unhealthful conditions and great property damage.

Professor Walter C. Voss, '32, of the Department of Building Construction at Technology is engaged in a study of why water penetrates brick walls and how leakless masonry walls may be built. From a review of facts determined by previous investigators it is concluded that leaky walls are due to one or more of three causes. These include the properties of the masonry unit and of the mortar separately and of the two as an assemblage; the detail character of the wall and auxiliary construction; and the quality of workmanship. The first of these factors is being studied by Professor Voss from many angles. Important properties of brick, such as modulus of rupture, compressive strength, absorption, and coefficient of saturation (a measure, perhaps, of vitrification, and of the degree of intercommunication of the capillaries in the brick), are being investigated. Similarly, many



Compass Analyzer (described in adjacent article) showing the Helmholtz coils and the pedestal on which the compass is fixed for testing. A project of Technology's Instruments Laboratory



*The Absorptometer, an instrument developed by Professor Walter C. Voss,*32, of the Department of Civil and Sanitary Engineering, for studies of the physical structure of common clay bricks, including their capillary characteristics, by measurement of water-absorptive properties. The instrument is a combination of balance, clock, and immersion tank, which gives a continuous record of the changing weight of an immersed brick, thus measuring the amount and rate of absorption*

variables of mortars are being examined. Another group of variables, those associated with brick and mortar combinations, as in walls, are known to affect the degree of permeability. Among these the phenomenon of bond is particularly important. Many investigators hold that water does not pass through porous brick or through the mortar (where these are of good grade) but seeps between the two, due to a break in bond or the interlocking tie between brick and mortar, at the plane determined by the edge of the brick and the adjacent mortar.

From recent research in Technology laboratories certain facts about this bond have been determined. It is extremely important for effective bond that brick and mortar, when first set, shall be in intimate contact. Such contact is necessary to allow the formation of a "bond layer," a thin section about two-thousandths of an inch in thickness which is formed at the top and bottom of each mortar joint. This layer is a very small fraction of the total thickness of the common masonry joint which is about one-quarter of an inch in thickness. The ultra-violet microscope, the petrographic microscope, and microchemical tests, have been used to study this bond layer, but the compounds which form it have not yet been identified. It is possible that x-ray examination will yield this information. Bond may be due to the interlocking of newly created lattice structures, the phenomenon of absorption, or to chemical reconstitution of both brick and mortar at the interface.

The best practical results in constructing leakless brick walls have been obtained when bricks are used which absorb water at a low but continuous rate after the first contact with the mortar and which absorb from five to ten per cent of their own weight in two days of complete immersion in water. This allows the mortar to build up a bond layer at the brick line which assures no separation at this point. Lime is required to supply the materials necessary for this action, and the best mortar for most general uses, with a good brick, is one composed of one part of Portland cement, one part of lime (putty preferably), and from five to six parts of sand, all by volume. This mortar, as determined by microscopic examination of joints, by tests of bond strength, and by use in actual construction by builders, has shown excellent results.

Managers

THE Institute was host to members of the New England group of the Educational Buyers Association, composed of business managers and purchasing agents of colleges and universities in this district, who met informally at Walker Memorial on February 28.

Under the direction of Horace S. Ford, Treasurer, and Delbert L. Rhind, Bursar of Technology, the group made a short tour of inspection of scientific and engineering developments being carried on at the Institute. During the afternoon an informal business meeting and discussion was held for the consideration of business and purchasing problems as applied to educational institutions. Twenty-two colleges were represented.

Laboratory of Instruments

INSTRUMENTS play an essential rôle in modern science and engineering. The lives of passengers on board an air transport depend upon the operation of complex indicating equipment, and in everyday life living conditions are improved by instruments for automatic control. In research, important forward steps are often assured when a new instrument becomes available. Since the same general design and test procedure can be applied to a wide range of problems, a laboratory devoted especially to the instruments used in mechanical engineering, aeronautics, and meteorology has been developed at Technology under the direction of Professor Charles S. Draper, '26.

Since the response of an indicator to rapid changes in an actuating force is often as important as accurate static calibration, the work on each type of instrument includes a study of dynamic characteristics. Fortunately, any usable indicating mechanism must be a system with one degree of freedom; that is, there must be a single position of the index for each value of the actuating force. This means that the well developed theory of one-dimensional systems can be used to advantage in examining the dynamic behavior of an instrument. This theory makes it possible to predict the performance of an instrument in terms of certain coefficients which depend upon details of construction. All the necessary information can usually be obtained from a few simple experiments carried out with the

proper apparatus. The procedure for a given instrument involves three steps: first, the dynamic coefficients are measured; second, the agreement of theory with experiment is checked in the laboratory; third, these data are used to make performance predictions under working conditions. An examination of the experimental results with the aid of the theoretical analysis will show whether or not the instrument can be improved for use under given conditions and indicates required modifications in construction.

Instrument work at M.I.T. has already produced several new indicators for internal-combustion engines. A new type of pressure indicator is in successful operation not only at Technology but also in several outside laboratories. An electrical indicator for pressure waves within the cylinder of an engine makes it possible to study quantitatively the processes which accompany detonation in the gasoline engine. In this instrument a coil is moved in a magnetic field by the pressure changes in the cylinder. The voltage from this coil is recorded photographically by means of a vacuum tube amplifier and a specially designed oscillograph. This research indicates that the characteristic sound of detonation is due to a system of standing waves within the cylinder for which the frequency may be calculated by means of the ordinary theory of sound. A modification of the pressure-wave indicator has been developed by Professor Edward S. Taylor, '24, into an instrument called the "M.I.T. Knockmeter" which is in use for measurement of the knocking characteristics of fuels. The special oscillograph has been adapted to a number of problems besides that of detonation, and an improved form of the instrument is at present used in a project to measure vibration of aircraft engines.

A continuation of the detonation project is now in progress with the coöperation of Professor Philip M. Morse of the Physics Department. With improved instruments and an extension of the theory, it is hoped to measure the shape and intensity of the initial disturbance which sets up pressure waves during knocking.

In the field of meteorology, equipment has been constructed for studying the response of recording thermometers and hygrometers to changing conditions. The

test apparatus is, in both cases, arranged so that steady conditions of temperature, humidity, and velocity may be set up in each of two closed systems containing air. By shifting a control handle it is possible suddenly to change the temperature or humidity to which the instrument under test is subjected, while keeping all other variables constant. In this manner, a practically instantaneous change is produced in the quantity to be measured.

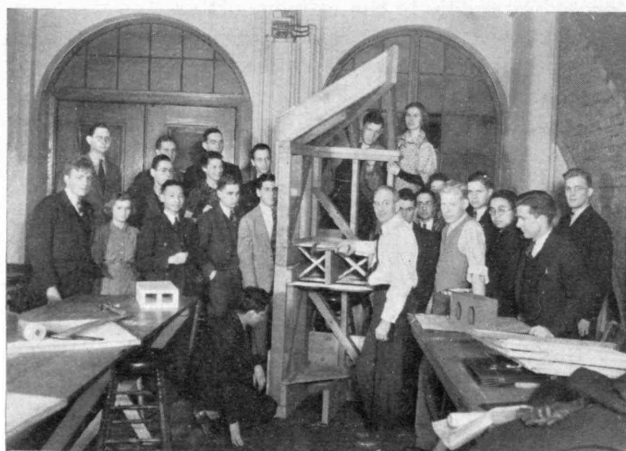
Several new types of test apparatus are used in the laboratory for studying aircraft instruments. An arrangement for subjecting instruments to mechanical oscillations of known frequency and amplitude along any arbitrary direction is used for finding the effect of vibration on the mechanism. A closed chamber in which the pressure may be varied in an arbitrary manner makes it possible to determine the dynamic characteristics of pressure-operated instruments such as the altimeter, rate-of-climb meter, or the air-speed meter.

An extension of previous theoretical work on the aircraft magnetic compass has suggested a simplified view as to the cause of the troublesome "northerly turning error" and indicates a possible procedure for improving the compass as a flying instrument. In order to facilitate experimental work on the compass, a compass analyzer has been constructed with which the essential compass characteristics may be studied in the laboratory. The analyzer consists of two Helmholtz coils, one fixed and the other free to rotate or oscillate with a controllable amplitude and frequency. The earth's field is "bucked out" by means of the fixed coil so that the behavior of a compass card may be examined in a field-free space or under the influence of a field from the movable coil whose magnitude and motion are arbitrary. The compass itself is mounted on a platform which may be used in combination with the movable field to find the effect of damping liquid on compass indications. It is hoped that the investigations now in progress will produce material improvements in the magnetic compass for aircraft use.

With the Preparatory Schools

TO hear the respective headmasters of Exeter and Andover, Lewis Perry and Claude M. Fuess, 125 members of the Alumni Council and Faculty Club and their guests attended the Council's 185th Meeting in Walker Memorial on February 24. Because of the importance of the speaking program all regular Council business was suspended until the March meeting.

In addition to Drs. Perry and Fuess, the guests of the evening included the heads or other executives of 16 New England preparatory schools who send students to the Institute — L. R. Thomas of Moses Brown, Charles C. Monie of St. Paul's, S. B. Southworth of Thayer, Franklin T. Kurt of Chauncey Hall, A. C. Ewen of Dean, C. H. Sampson of Huntington, C. M. Underwood of Manter Hall, W. H. Lillard Jr. of Tabor, C. P. Quimby of Cushing, C. E. Amstutz of Sanborn, Lynwood Chase of the Country Day, J. E. Coons of Tilton, T. R. Morse of Belmont Hill, R. T. Twitchell of Browne and Nichols, E. W. Eames of Governor Dummer, and H. F. Cade, Jr., '28, of Berkeley.



Students in the School of Architecture, who are designing an actual house to be built in Wellesley, Mass., learn some of the fine points of framing from a master carpenter

President Moreland, on behalf of the Council, and President George R. Harrison of the Faculty Club, on behalf of that body, briefly and felicitously welcomed the guests of the evening, following which Dr. Perry was introduced.

He emphasized the cordial relations existing between Exeter and Technology, as exemplified by prizes in science established at Exeter by Dr. Compton, by the acceptance of students at the Institute with "advanced standing," and by the pleasure he had found in the reasonableness of the Institute's attitude with respect to incoming freshmen as exemplified by contacts his school had had with Dr. James L. Tryon, the Director of Admissions.

In some detail he explained the efforts being made at Exeter under the Harkness Plan to decrease the size of classes, to reduce classroom formality, and to make it possible that a more vital and closer relationship exist between instructor and student. Recent Exeter men have done better in college than their predecessors, and the number of failures at Exeter itself has been reduced from 23 per cent to less than five per cent.

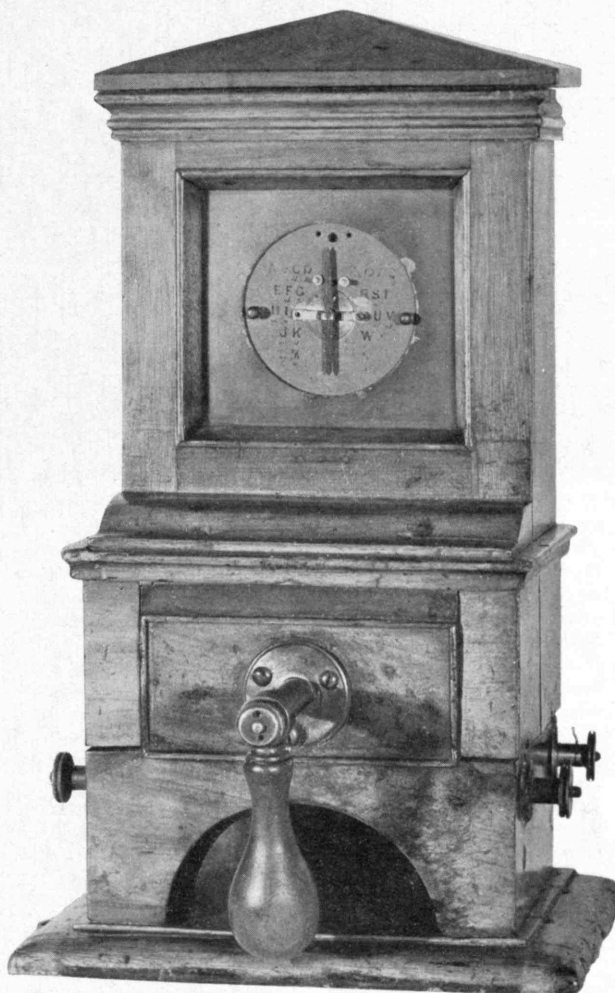
Dr. Perry, after studying English preparatory schools, felt that American schools could do more to stimulate interest in science among their students, and in creating a public spirit in this country. He believed that preparatory schools must preserve a spirit of democracy, and that our present national situation emphasizes that we are confronted by a race between chaos and education.

As the second and final formal speaker, Dr. Fuess also paid tribute to Dr. Tryon and deprecated (as had Dr. Perry) his own knowledge of science. Nevertheless he, too, had an interest in science and so did Andover which had produced several notable scientists such as S. F. B. Morse and H. A. Rowland. But for some reason the preparatory schools did not seem to be fertile training grounds for the prominent scientists.

Genius, he felt, demands a type of freedom that the preparatory school in the past has not always provided, although greater and greater attention is now being paid to developing the exceptional student. The trend at Andover is to adapt its system to the needs, abilities and gifts of individual students. Great efforts are also being made at Andover to promote mutually friendly relationships between teachers and pupils, accepting the definition that education is the transmission of life from the living, through the living, to the living.

At President Moreland's request, Dr. Tryon keynoted the ensuing discussion in which some score of those present took part, by describing the new attitudes of the Institute toward admissions: the upper fifth plan, the policy of stabilization of enrollment with its corresponding emphasis on accepting a selective group of freshmen not exceeding 600 in number, the increase in freshman scholarship funds, and the endeavor to help upper classmen by scholarship aid and through the facilities of the Technology Loan Fund. In concluding the meeting, Dr. Bush commented upon the similarity of the problems facing preparatory schools and institutions like Technology, and expressed the hope that the Institute might be able to direct more of its graduates into the field of preparatory school teaching.

A NEEDLE TELEGRAPH INSTRUMENT



This needle telegraph instrument, a type which antedates the Morse system, was recently presented to the Institute by James P. Ramsay of Lowell. Mr. Ramsay, born in Scotland in 1861, came to America in 1880. Before coming to America he worked in telegraph offices, learning to operate the needle telegraph at the early age of 10. In 1877 when 16 years old he was hired by the Lancashire and Yorkshire Railway as a tower signalman. "I think and have not been disputed," writes Mr. Ramsay, "that I was the youngest person ever in charge of a signal tower in Great Britain."

In his second year after having arrived in the United States, Mr. Ramsay was hired by the Boston and Lowell Railroad to open up their new switch and signal tower at Lowell, Mass. This tower, with 61 levers, was probably the first in New England. Subsequently he became distinguished as a pioneer probation officer.

While on a return trip to England he picked up two of the old needle instruments from a junk pile at York. One was sold to Henry Ford and is now at Dearborn; the second, through Mr. Ramsay's generosity, is now at the Institute.

In this instrument the magnetic needle is pivoted in the center of a wire coil to actuate the pointer in front of the dial. Deflection to right or left signifies given letters. These deflections are produced by sending over the wire pulsations of one polarity or alternations of both as required by the letter to be transmitted.

The needle telegraph was invented in 1836 by the Englishman, Sir W. F. Cooke. Sir Charles Wheatstone aided him, and for years a controversy raged over the proper allocation of credit for the invention. The needle type was extensively used in England before the Morse instrument supplanted it



The Bucentaur, designed by Ralph Adams Cram, which carried the Institute's charter and seal across the Charles in 1916. As *The Review* for July, 1916, reported: "Some lingered by Rogers Building to see the first act of the pageant, the procession that was to cross in the Bucentaur. The old steps were alive with the color and dignity of pageantry. Undergraduates in costume, halberdiers, Venetian sailors, the vice-marshal, C. Howard Walker '99, looking more like a Venetian doge than most modern men can, scattered groups of the Faculty in gowns and colored hoods. Presently in the early twilight the procession formed: the vice-marshal in crimson velvet with doge's cap; James P. Munroe, Secretary of the Corporation, bearing in its small golden casket the seal of the Institute; his guards, Professor R. G. Hudson '07 and Lester Gardner '98, in scarlet; the great gilded and ornamented chest, swung on the shoulders of four bearers in the colors of Tech, loaded with the charter and archives of the Institute; the halberdiers and sailors in red and gray, and finally the long black-clad procession of Faculty and Corporation, 80 strong. They marched, solemnly, without music, to the float of the Union Boat Club where the Bucentaur waited.

"The Bucentaur was modeled after the state barge of the same name in which, during the great years of the Venetian Republic, the doges yearly wedded the Adriatic. Long and broad, with high square bulwarks, pure white, save for the long frieze on either side amidships where on a background of red there ran a riotous bas-relief of nymphs and fauns. Below, nearer the water-line, was set a long line of gleaming mermaids in high relief, with Tritons at the prow above the ram. Above the prow was a great seated figure in white, a strong woman with a lifted torch, Mother Technology, enlightening the World. At the stern the barge bore a high red canopy like a poop, above which floated the flag of the Institute. The bulwarks were lined with the particular banners of the classes.

"The great chest was deposited on the deck, still guarded, the oarsmen sat at the long sweeps below, the Faculty and corporation massed on the afterdeck. High Admiral Henry Morss, costumed like Columbus, gave the word to cast off, the student orchestra sounded the opening bars of Grieg's 'Land Discovery' and to the salute of bombs and rockets, the Bucentaur moved slowly out across the Basin, the long sweeps plying in perfect unison, to where the searchlights of the pageant were waiting to pick the flotilla out in the gathering darkness. This was the first act of the pageant, the conveying of charter and seal.

"In the meantime the ten-thousand spectators were slowly filling the two long low stands that rested against the sides of the great court, cool and gray in the early evening. Before the main colonnade in the center stood the governor's throne, an old chair of state, under a tall crimson canopy bearing the Indian seal of Massachusetts. In the center of the stands on either side rose two smaller replicas for the mayors of Boston and of Cambridge. In the stand on the eastern side of the open end of the court the 500 chorus singers were in place . . ."

Mechanical Engineering

AS sixth in the series now appearing in its pages *The Review* presents an abstract of the report of the Corporation Visiting Committee on the Department of Mechanical Engineering.

DEPARTMENT OF MECHANICAL ENGINEERING

The Committee spent some time in discussion of various phases of the Department work, after which the various laboratories were visited. Some of these were familiar scenes; others were to us entirely new and were illustrative of the continual progress that is being made in this, as in other departments of the Institute.

Preparatory to a second visit, the Committee examined present conditions in more detail and obtained the following notes: Expansion of facilities for research, involving space, apparatus, and funds, must be considered secondary to the development of outstanding men to inspire and direct such research. From time to time necessary facilities become obvious and can be improvised or made the subject of a special appeal to an interested industry. Recently we have added Professor deForest to develop a laboratory for the study of the dynamic strength of machine elements, to explore the unknown field between the known static strength of materials, fatigue and shock resistance, and the machine designer's calculations of the maximum stress in the part. A generous donor has provided funds for the initial equipment of the new laboratory.

The second important addition to the Faculty is Professor Keenan, '22 (from Stevens Institute), an expert in steam-turbine design and thermodynamics. Professor Keenan is the author of the present steam tables and will be engaged with Dr. Keyes of the Chemistry Department in the computation of new standard steam tables to give effect to recent research at high pressures. Professor Keenan is inaugurating research on flow of steam through nozzles. No further facilities are required, for the moment.

Professor Wilkes, '11, and his Heat Laboratory have been transferred from the Physics Department. It is too soon to suggest what changes, if any, will be required in his equipment. Eventually it would be advantageous to locate this laboratory with the rest of the Department, but at present no space is available. For air conditioning and refrigeration work, we are fairly well equipped both as to personnel and facilities, but the laboratory is housed in a temporary building. For steam engineering, the laboratory facilities seem to be adequate, but we need a special turbine in which rotor, nozzles, and so on, can be changed and the effects investigated experimentally.

The Testing Materials Laboratory is in good shape for undergraduate instruction and, with Professor deForest's ('11) new laboratory for graduate work, we are complete on the metal side. For concrete, there is much to be desired and a study is being made in co-operation with the civil engineers as to what is needed for advanced work. The Textile Laboratories are productive of valuable research results and offer excellent opportunities for graduate students. The Automotive Laboratory (for internal-combustion engines) is outstanding in this country and is (Continued on page 284)

THE NATION'S *Calling* LIST



THE telephone directory is the nation's calling list. Millions of people refer to it daily—in homes and offices and in public pay stations. It is the busiest book—it plays a part in countless activities.

For the names in the telephone book are more than names. They are friendships and homes and families. They are bridge parties and golf games—business successes—buyers and sellers of wheat or pins or skyscrapers.

More than 12,000,000 names are listed in the directories of the operating companies of the Bell System. You can go straight to any one of these millions of people—easily, quickly and economically—by telephone.

The classified directory is an important feature of your telephone book. It is a handy, reliable buying guide—a quick, easy way to find "Where To Buy It."

BELL TELEPHONE SYSTEM



well staffed. For automotive vehicles, we are not so well equipped for experimental and research work. We have cut-away chassis of several makes for study by classes in design and have a test car for road testing. However, testing on the public roads is unsatisfactory and dangerous and can be done only under careful restrictions. The need is for a chassis dynamometer on which the drive of the rear wheels may be measured and the vibration characteristics of the front wheels and suspension studied at various speeds. Ultimately, a building or some generous space is needed in which automobiles and parts may be displayed for historical comparison to give background to students of design.

The Machine Tool Laboratory is well equipped but should evolve slowly from a place in which to teach the elements of the machinist's art (shop course) to a laboratory for the study of metal cutting, tools, precision methods of manufacture, and so on. Other schools have been cutting down the time spent in the machine shop; our hope, however, is to hold to a generous allotment of time but to alter the content of the course. The Mechanical Processes Shops are being thoroughly overhauled: The pattern-making work has been dropped and its elements merged with foundry; the foundry course is being changed to a course in foundry practice with emphasis on control of quality of casting. The Department of Mining and Metallurgy is cooperating in modernizing the equipment. The forging shop course has had the blacksmith work curtailed in the interest of power forging, arc and gas welding, and other processes of

metal working. We are in need of die casting, extrusion, pressing, stamping, and other types of equipment, to illustrate metal working processes used generally in manufacturing.

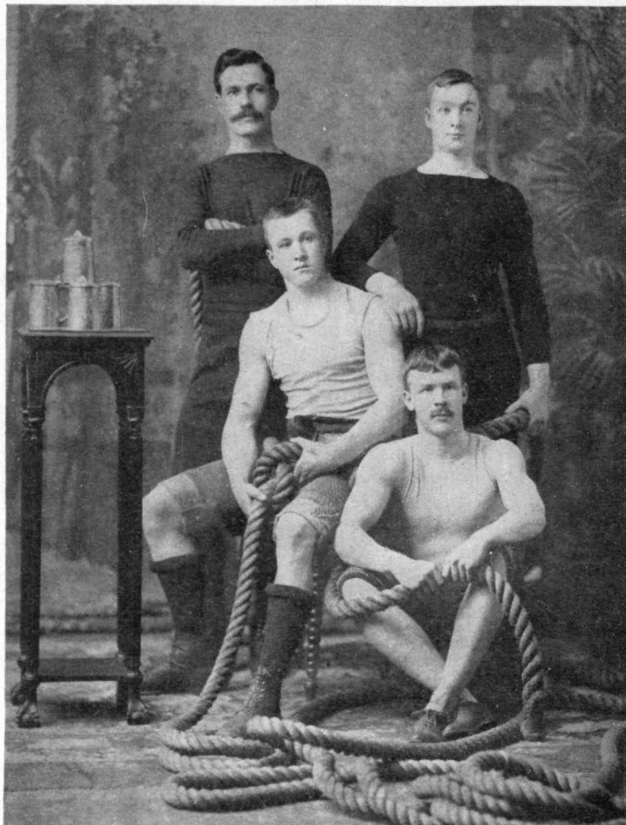
We must recognize the fact that constant changes occur in the range of problems which confront the engineer in his daily practice and that, while the underlying principles remain, there must be developments and expansions in the scope of the curriculum of the course in accordance with professional requirements. That which was adequate when some of us were undergraduates no longer will suffice. We cannot be satisfied that the Institute's course in mechanical engineering should fail to provide facilities for the most advanced student, as well as properly to prepare the average undergraduate to meet successfully the requirements of his later engineering work.

Considering first, as we think should be the case, the problem of the undergraduate and how best to employ his time during his four years' course, we find there is pressure to crowd into the time available additional instruction in: (1) *Electrical Engineering*. It can be shown that the mechanical engineer's ability to cooperate with electrical engineers in certain problems of machinery design and application might be improved. (2) *Business*. Many of our engineering graduates become junior executives early in their careers and practically all are concerned at some time with cost accounting, patents, contracts, sales, and so on. (3) *Science*. In comparison with some European universities, our mechanical engineers are not so thoroughly grounded in applied mathematics and theoretical mechanics, and an additional year in these subjects would furnish a better foundation for advanced work.

It appears to the Committee that additional time for electrical engineering would be advantageous but such time cannot be found in a four-year curriculum without sacrifice of important work in other subjects. Similar remarks apply to business and science. However, it is now possible for a student in his fourth year to elect one such subject. For those especially interested in advanced work or in broader training, a fifth year of study is recommended.

In the second and third years, the course has been recently rearranged to provide for instruction in the basic metal-working processes of manufacturing (machining, forging, welding, foundry, and so on) correlated with the courses in strength of materials, metals, and machine design. The time devoted to these courses serves to balance the intellectual pressure of more analytical subjects and has a wholesome effect. However, for those students who are able to obtain a satisfactory understanding of these basic processes through summer employment or attendance at summer school here or elsewhere, it is recommended that full credit be given and the student be excused from the equivalent process course.

The Committee, in this connection, is interested to note the recent Faculty authorization of Course II-A, in cooperation with the General Electric Company. In this course, students after the completion of two years at the Institute, including elementary work in machine shop and foundry practice, will (Continued on page 286)



In the days of brawn and mustachios. Technology tug-of-war team in 1887 with the steins they won. Who can identify the stalwarts?

Chemistry

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to better living!*

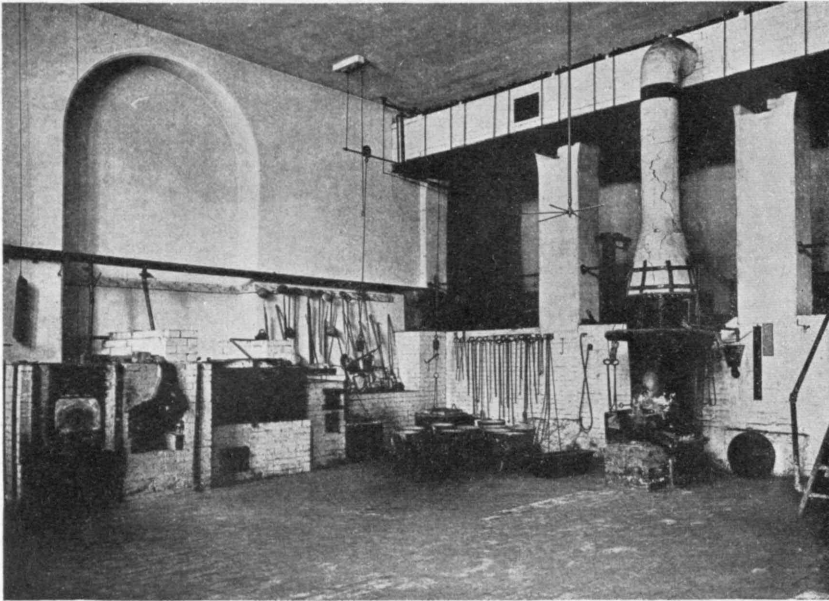
Chemists discovered cellulose film — and millions smoke cigars and cigarettes which have not dried out and buy food that has not been exposed to dirt and moisture because they are wrapped in "Cellophane". Chemists discovered how to make dyes which will not fade and millions of women are saved from loss and disappointment. Chemists discovered how to make better paint — and millions of homes are durably beautiful. Chemists discovered how to make gasoline more powerful — and millions know the joy of better car performance. Chemists discovered how to make rayon — and millions are gratified by beautiful new fabrics.

So many things that make living easier and pleasanter are the result of the tireless research of chemists. Du Pont chemists are endlessly exploring new possibilities for human betterment and enjoyment.

BETTER THINGS FOR BETTER LIVING — THROUGH CHEMISTRY



PRODUCERS OF CHEMICAL PRODUCTS SINCE 1802



The old metallurgical laboratory in the basement of Rogers

thereafter omit process and manufacturing subjects at the Institute in favor of more extensive and practical instruction and practice at the manufacturing works. This seems to us to be sound educational policy and in line with our suggestion to embrace all opportunities for students to learn the practical details of manufacturing processes in industry rather than in school. There is likewise much to be said for learning the details of business in a similar manner. The Institute's courses should discuss principles and methods not readily acquired by experience.

As regards facilities for graduate students, the Committee feels that there is no serious question of equipment involved. Graduate students of high type are attracted by the leadership of Faculty members who become preëminent in their field of engineering. Facilities for research should be devised to meet special problems as they are recognized. It is also necessary to offer advanced courses of instruction to meet the needs of graduate students. The Committee feels that the advanced work in engineering mechanics, fluid mechanics, heat transfer, plasticity, and elasticity available in the Department should be second to none. It will be noted that the amount of new equipment required is relatively very modest. Possibly some friends will feel impelled to donate the special turbine for experimental work and the chassis dynamometer for testing drives and vibrations in the laboratory.

Alumni Association Anniversary

PILING Ossa upon Pelion 1936 presents still another milestone in the history of the Institute — the 60th anniversary of the first annual meeting and dinner of the Alumni Association.

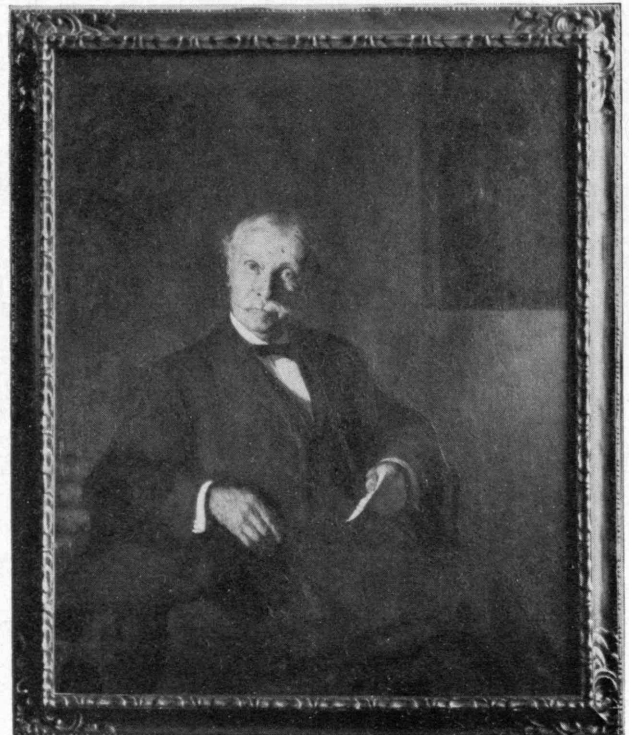
To the Class of 1873 belongs the credit for initiating our Alumni Association. At the first annual meeting of this Class following its graduation the organization of an alumni association was proposed and a committee

was appointed to study the matter. This committee, made up of William A. Kimball, George W. Blodgett, and Webster Wells, immediately set to work. A poll of the 90-odd graduates of the Institute at that time indicated hearty support of the proposed organization, and with this backing the committee called an organizational meeting to be held on January 29, 1875. The 27 Alumni present elected Professor Robert H. Richards, '68, President, and Mr. Kimball, Secretary. It was at this meeting that Mr. Kimball outlined the purposes that his committee felt that the Alumni Association might pursue.

"Before completing our organization," he said, "it seems advisable that we should consider why we are to form an association, and the objects that we have in view. I wish to offer a few suggestions, not because my personal opinion is particularly

valuable, but as it is the result of the opinions of those who have written to the Committee on this subject and many of the writers are not here to speak for themselves.

"An alumni association is more especially desirable for us than it is for college graduates, inasmuch as we do not, like them, further continue our preparation for work by means of law schools, medical colleges, and so on, but at once make a practical use of our Institute training. We naturally, there- (*Continued on page 288*)



Robert H. Richards, '68, graduate of the Institute's first class, oldest living graduate, and first President of the Alumni Association

To Tech men who use concrete

It is particularly gratifying for us, at this Diamond Anniversary of Technology, to make our first published announcement of an outstanding contribution to the building industry made possible through the ingenuity, research, and perseverance of Technology graduates.

For years our research chemists had been studying the physical reactions of certain complex organic compounds (called dispersing agents) on aqueous suspensions of finely divided particles. In the course of the research, the tendency of ordinary portland cement to clump together or to agglomerate was studied. It was discovered that certain of these new dispersing agents would keep the fine particles from agglomerating into clumps, so that each particle was free to act as a separate entity.

What does this discovery mean to users of concrete?

Let us look at the facts. With the cement particles agglomerating into clumps, the individual particles of cement have lost their lubricating power, and more water is needed to develop a given slump. Further, with the cement particles in clumps, then the chemical reaction of setting and hardening has to occur in and between the clumps. It takes time for the reactions to work into the center of the agglomerates. The cement strengthens slowly. Consequently, anything that keeps the particles apart, without impairing the reaction of cement with water, is highly desirable.

Five years of research, in which over 50,000 full-size concrete cylinders were tested, confirmed our original conception. In addition, mill runs in which the new material was added to the cement clinker before final grinding, showed that it acted as a remarkable grinding

aid and lessened the tendency of the dry particles to clump together in warehousing.

To the best of these newly developed dispersing chemicals was given the name TDA.

What are the advantages of a TDA cement?

First. Because each cement particle can act as an entity, the chemical reaction of setting is faster and produces a finer-grained concrete, which means that TDA cements make high early and high ultimate strength concretes.

Second. As each cement particle acts alone, it possesses greater lubricating power, and therefore TDA cements require less water for the same workability, yielding a more durable cement with higher compressive strength.

Third. TDA concretes have practically no tendency to "bleed" water, giving dense concretes with a minimum of porosity. Laitance is practically eliminated, allowing better bonding between successive pourings of concrete.

Fourth. Severe freezing and thawing tests have shown that concretes made with TDA cements are less permeable and therefore more durable.

TDA can indeed be classed as another important achievement of Technology graduates to the improvement of materials for the use of mankind.

Technology graduates interested in more detailed information regarding technical details or sources of supply for TDA cements in their localities are invited to write us direct at our Cambridge office.

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Tech men who are members of our organization:

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Edmund G. Blake
Haskins B. Canfield
Carl A. Carey
Frank N. Cramton
Bradley Dewey
Joseph P. Fahey

Hugh S. Ferguson
John C. Gale
Leonard H. Goodhue, Jr.
Gordon E. Gott
Fisher Hills
Langley W. Isom
Ralph W. Leach

Arthur J. Leydon
John A. Lunn
Jacob G. Mark
Maurice Mason
Edward L. Mears
Theodore T. Miller
Stephen B. Neiley

John J. O'Brien
Harold C. Pearson
Richard Piez
Albert J. Puschin
Arnolf P. Rehbock
Alan G. Richards
W. Campbell Ross

Dunbar L. Shanklin
Willard J. Slagle
William L. Taggart, Jr.
Kenneth Tator
W. Allen Vorce
Frederick E. Walch, Jr.
H. M. Weddle

fore, take a more immediate interest in our Alma Mater and are sooner qualified to estimate the value of her course of study. It is good that we should regard the pleasure of meeting together socially, but this is not our first object. It seems to me that we owe a duty to education and science in general, and to the Institute of Technology in particular, that we can only pay by strengthening its hands and increasing its influence in every possible way. This we shall do at once by forming an Alumni Association and limiting the membership to those who have been endorsed by the degree of the Faculty. We show them that the degree of the Institute means something to us, and we, in some measure discourage the idea, too prevalent in the school, that it makes little difference whether or not a man

takes the required course. If we find by experience that the regular courses are not good, let us advise with the authorities — not encourage a disregard of their requirements.

"The elder Alumni can also directly benefit the Institute by doing what lies in their power to furnish graduates with work, by recommending them for vacancies where they have influence, and by informing them, through the Secretary of the Association, of such openings as they know of in different parts of the country.

"I think, gentlemen, that the Alumni may in the future give an immense help to the young graduates in their start in life. In so doing they will assist progress, they will assist the cause of (Continued on page 320)

H. J. LOHBILLER, President
Member A.S.M.E.

W. P. WERNER, Vice President

AMERICAN POWER PIPING CORPORATION

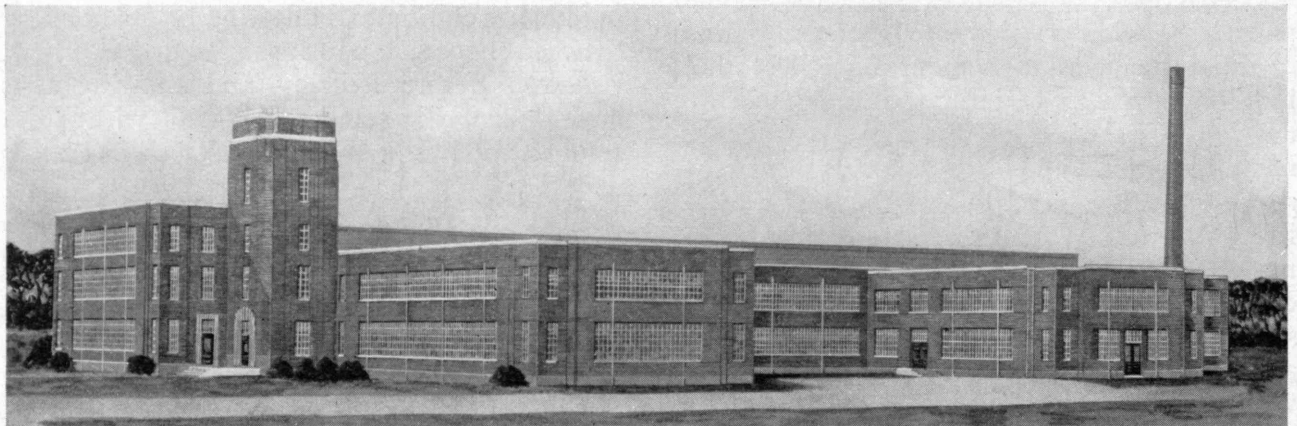
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A Practical Demonstration of Progress

This new radio tube factory now being built in Salem, Mass., is tangible evidence of our continued growth. This factory will incorporate the most modern ideas in line production and will be devoted exclusively to the manufacture of Sylvania Radio Tubes thus releasing our present factory in Salem for the exclusive production of HYGRADE Lamps. Among our officers, executives and key men, 25 have had the advantage of an education at M.I.T. and it is known that this training has been important in the success of the corporation

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CORPORATION
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Stone & Webster is Proud of its Tech Heritage

FOR many years Stone & Webster, Inc. has been identified with Technology not only because its founders, Charles A. Stone and Edwin S. Webster, were graduated with the Class of '88, but also because of the large number of Tech men who have been and are in its employ. To relate the individual accomplishments of these many graduates would be to compile a record of significant contributions to the advancement of industry and society, but there is the danger that the importance of some contributions might be overlooked and injustice result. • For forty-seven years this organization has renewed its vigor as a strong team with younger blood coming in and some of the older progressing to other fields. • Throughout this period Stone & Webster has endeavored to establish and maintain a standard of integrity and engineering accomplishment which will reflect credit upon Technology and its graduates.



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LONDON, ENGLAND



J. H. Pratt, Vice-President	M.I.T. 1912
P. F. Lavedan, Vice-President	M.I.T. 1920
H. S. Tirrell, Gen. Supt. Gas Plants	.....	M.I.T. 1913
F. B. Hunt, Chief Engineer CO ₂ Div.	.....	M.I.T. 1920
E. D. Hale, Chemical Engineer	.....	M.I.T. 1916
O. W. Fick, Gen. Service Mgr.	.....	M.I.T. 1914
W. A. Brown	.....	M.I.T. 1931
G. L. Howse	.....	M.I.T. 1934

TECHNOLOGY REVISITED

(Continued from page 271)

recognized authority in blind flying and landing, the presidents of several aircraft firms, expert test pilots, the chief aeronautical engineers for Army and Navy and for the Department of Commerce, are Technology Alumni.

Among the graduates of Course VI (Electrical Engineering), to take a single Course by way of example, are no less than 105 corporation presidents, 67 vice-presidents, 27 chief engineers, 26 consulting engineers, 16 full professors of electrical engineering, 10 general managers, nine heads of electrical engineering departments, eight deans of engineering, besides directors of research, general superintendents, and various others holding posts of responsibility.

A large number of Federal executive positions, technical in their requirements, are held by Technology Alumni. During the World War, the services of Technology men in the field, in the air, and on the sea, as well as of M.I.T. as a training institution, were nothing less than extraordinary in scope and quality.

These are but illustrations of the measure in which engineers and research scientists who have received their training at the Institute have so proved their efficiency that they have risen to posts demanding judgment and initiative in addition to technical competence — plus character. Distinguished Technology names, almost without number, so crowd the record that merely to list them, with their achievements, would fill the present issue of The Review from cover to cover. It is because of this that President Compton could say, in his last report to the Corporation of the Institute: "It is almost overwhelming to contemplate the extent of the influence, direct and indirect, which this institution has had in shaping the last 70 years of the development of our country — in engineering accomplishment, scientific progress, creation of new products, and promotion of public health."

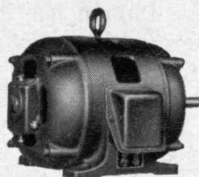
These results have been attained by methods which this institution largely pioneered, and still follows. They are the methods that have given us a new learned profession — the engineers. They are methods that have developed, in new fields, the very highest qualities aimed at by all educational systems, old and new: competence, character, and again competence.

ON revisiting the Institute after 70 years — for it was not till four years after the charter that the school actually began — it is helpful to recall the pattern of the academic world in the Founder's time, with its typical college of liberal arts, and then to set over against that background our present concepts of higher education and our present cultural aims and instrumentalities.

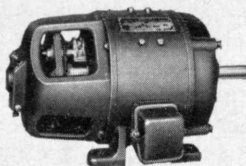
On April 10, 1861, the exact charter date, Darwin's "Origin of Species" was not yet two years old. That is to say, the evolutionary hypothesis, so familiar to the scientific world ever since, was then a matter of intense controversy and a startling novelty. To a great body of educated persons, it seemed, indeed, a rather shocking break with what had passed for fundamentals.

(Continued on page 292)

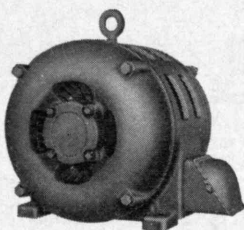
Century MOTORS



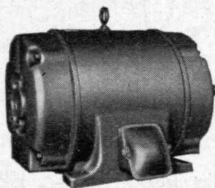
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TECHNOLOGY REVISITED

(Continued from page 290)

Again, the liberal arts college was at the apex of our general educational system — for the university, in the proper sense, first came with the establishment of Johns Hopkins, 15 years later. The liberal arts college provided, chiefly, two things: a preparatory training for the learned professions and the accepted finishing school for gentlemen. Science, on the whole, was tolerated in the curriculum, but was by no means rated as a “discipline” comparable to the Greek and Latin classics, while medicine, the ministry, and the law were, distinctively, gentlemen’s careers. Indeed, training in medicine was then about the nearest thing to a training in science that even the American professional schools had to offer; so that the approach to science was largely through medicine, when it was not through geology, which had somehow received the stamp of an especial respectability. The colleges, on the physical side, were for the most part jumbled groups of ill-planned and ill-coördinated buildings, each of which had been put up as a unit, commonly as the gift of some benefactor and identified with his name.

Such, in the rough, was the American academic and scientific picture around the Fifties and Sixties of the Nineteenth Century. Yet great scientific men were then creative, and the beginnings of our scientific and evolutionary age were plainly visible to those of independent and adventurous temper who had caught something of

the spirit of the pioneer and the discoverer and were striking out for new intellectual territory. The Rogers brothers, of whom William Barton was the more gifted, were of this science-minded fellowship, forerunners of our science leaders, personal and institutional, of today. Rogers could write a review of the “Origin” which, for detachment, openness of mind, and critical balance, was a generation ahead of its time.

Alongside the older academic tradition thus outlined and surrounding these chosen spirits of scientific anticipation, was the new industrialism — born another 75 years earlier with the birth of the factory system, the use of machinery, and the division and subdivision of labor — which was pressing eagerly and vigorously forward toward fresh conquests.

Finally, America possessed a vast, if unmeasured, store of natural wealth, as yet hardly more than tapped, the extraction and conversion of which for human comfort, convenience, and luxury, offered such returns to capital and to brains as the world had not yet seen.

As a result, America was needing, hungrily needing, what scientists and engineers alone could supply, while the accepted academic system could not, or at least did not, produce these technicians. Thus the school of pure and applied science had become an economic requirement at the very time when both pure and applied science were making their importance more and more felt by those of vision, and when scientists were beginning to urge the claims of their disciplines and their findings to a place in cultural life. *(Continued on page 294)*

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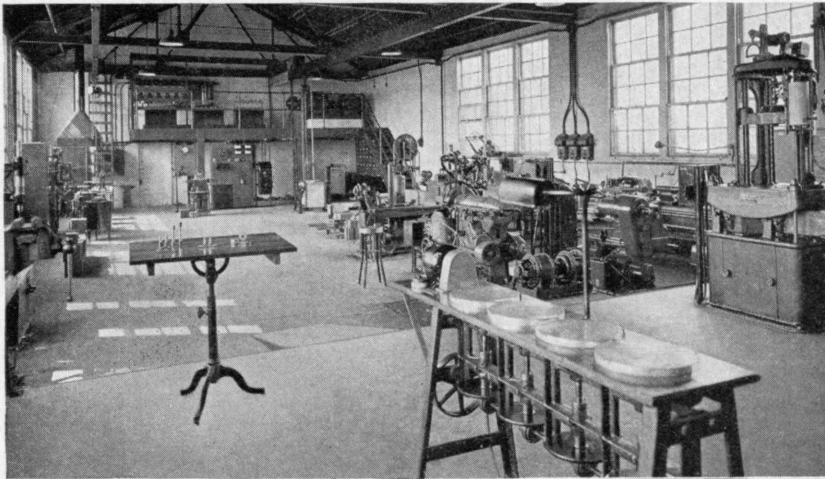
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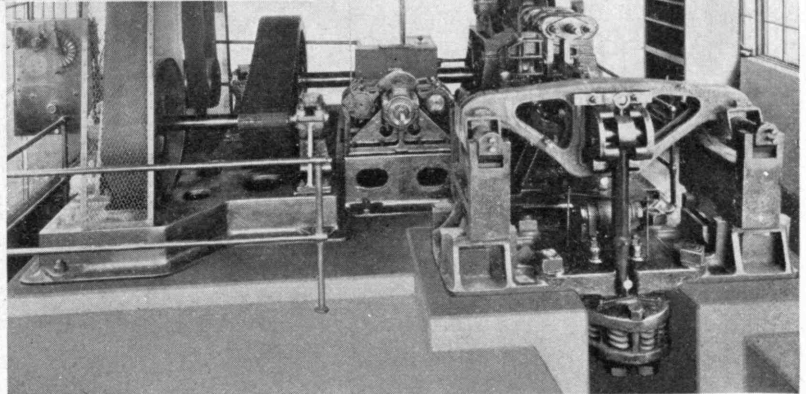
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TECHNOLOGY REVISITED

(Continued from page 292)

These forces it was which worked together, in such sensitive and penetrating minds as that of Rogers, to evolve that type of "polytechnic" or "technological" or "practical science" school which would give them for the first time effective expression. Few men have possessed at once the informed imagination, the scholarship, the practical sense, and the shining personality which were combined and fused in the drafting of the project which Rogers first outlined in surprisingly complete detail and then brought into being by the application of unconquerable vigor, tact, and resource. So was born a new type of cultural institution.

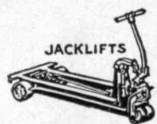
The "first things" of the Institute are familiar to students of education. They include: the first laboratory of physics used as a method of student instruction; the first mining and metallurgical laboratory for the instruction of students by treatment of ores in quantity; the first laboratory for teaching the nature and use of steam; the first laboratory for testing construction materials in commercial sizes; the first department of architecture; the first department of aeronautics; the first department of electrical engineering; the first specialized courses in sanitary engineering, in chemical engineering, and in naval architecture; the first American courses in industrial biology and in public health engineering. These are, of course, landmarks in American educational methods and objectives; and they anticipated much

that is most modern in pedagogy. They were examples of "learning by doing" before that slogan was coined, and to them should be added the early work of the Institute toward finding a substitute for the apprenticeship system, which was then by way of perishing. This took the form of instruction in the use of tools, a form of training that presently was passed on to the public school system, where it finds its appropriate place in the trade school.

The whole spirit of Technology was a spirit of modernity, and this spirit may be contrasted — more vividly now, perhaps, than at any earlier or any later time — with the educational tradition of the pre-Technology days.

THE characteristic spirit of the M.I.T. finds its material embodiment in its great educational plant. Here the several departments of study and instruction are brought together under a single roof. In the main building, almost 800 feet in length and bounded by a rectangle the four sides of which, taken together, exceed half a mile, the disciplines are housed side by side. In the allotment of space for each of them, provision for expansion or contraction as need might arise has been made. Such unity and coordination of structure were, and are, unique.

Corresponding to this is the further spiritual unity of cooperation. The disciplines so assembled are no longer regarded as independent. The partitions that separate them in theory and in function (Continued on page 296)



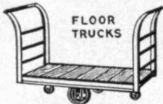
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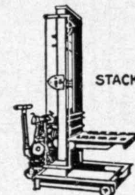
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TECHNOLOGY REVISITED

(Continued from page 294)

are as conventional as are the partitions that separate them in fact. Never before, as here at Technology, have the problems of research and of technical proficiency been dealt with as coöperative projects, to be studied and solved coöperatively. This spirit, so distinctive of the methods of study and instruction at the Institute, is in perfect agreement with that most modern of philosophic generalizations according to which the entire field of scientific knowledge is seen as fundamentally one, and the sciences are become members of a single intellectual family.

Even in this sphere of modernity, one may still cite the Founder: When urging some of the indirect advantages that might be expected to flow from such a school as he planned, he contended that in some respects it would subserve a higher purpose than technical instruction "by leading the thoughts of the practical student to those wider and elevated regions of reflection to which the study of Nature's laws never fails to conduct the mind." "It is easy," said he, "to extend the golden chain of relations until they may embrace every realm of nature and of thought." As a matter of fact, Rogers never broke with the cultural climate in which his own spirit had blossomed and fruited. He did not come to destroy but to fulfill the tradition — to add to and enrich the so-called "cultural studies," not to displace them. Because of this, the Institute, in a like spirit and

like mind, has retained the cultural studies as indispensable to a rounded training. In recent times it has especially emphasized the practical advantages that are offered to the technical man who, besides his technical skills, has gained at least some general awareness of the social bearing of his profession, its social relationships and obligations, and its social values. Degree requirements include study in history, sociology, economics, English composition and literature, and philosophy, as well as extensive drill in technical writing and public speaking.

Of the Faculty of the Institute — the men who from the first set its standards and till now have made it educationally what it is — it is difficult to speak without adding sentiment to respect and admiration. They have not only broken fresh trails, but inspired others to original work. By virtue of that intellectual audacity which takes on difficulties in the spirit of high adventure, they have built into the Institute tradition a bold and patient faith in the rewards of work and the dignity of supreme effort.

Student life at the Institute, apart from study, has steadily become more commodious, more varied, more interesting, and less burdened with financial care. This year students have had scholarship aid totaling \$170,000. By the end of next year, loans to students will have reached the million-dollar mark. The principles of student government, as established 35 years ago, have continued in force ever since, in spite of the greatly increased attendance and the far (Continued on page 298)



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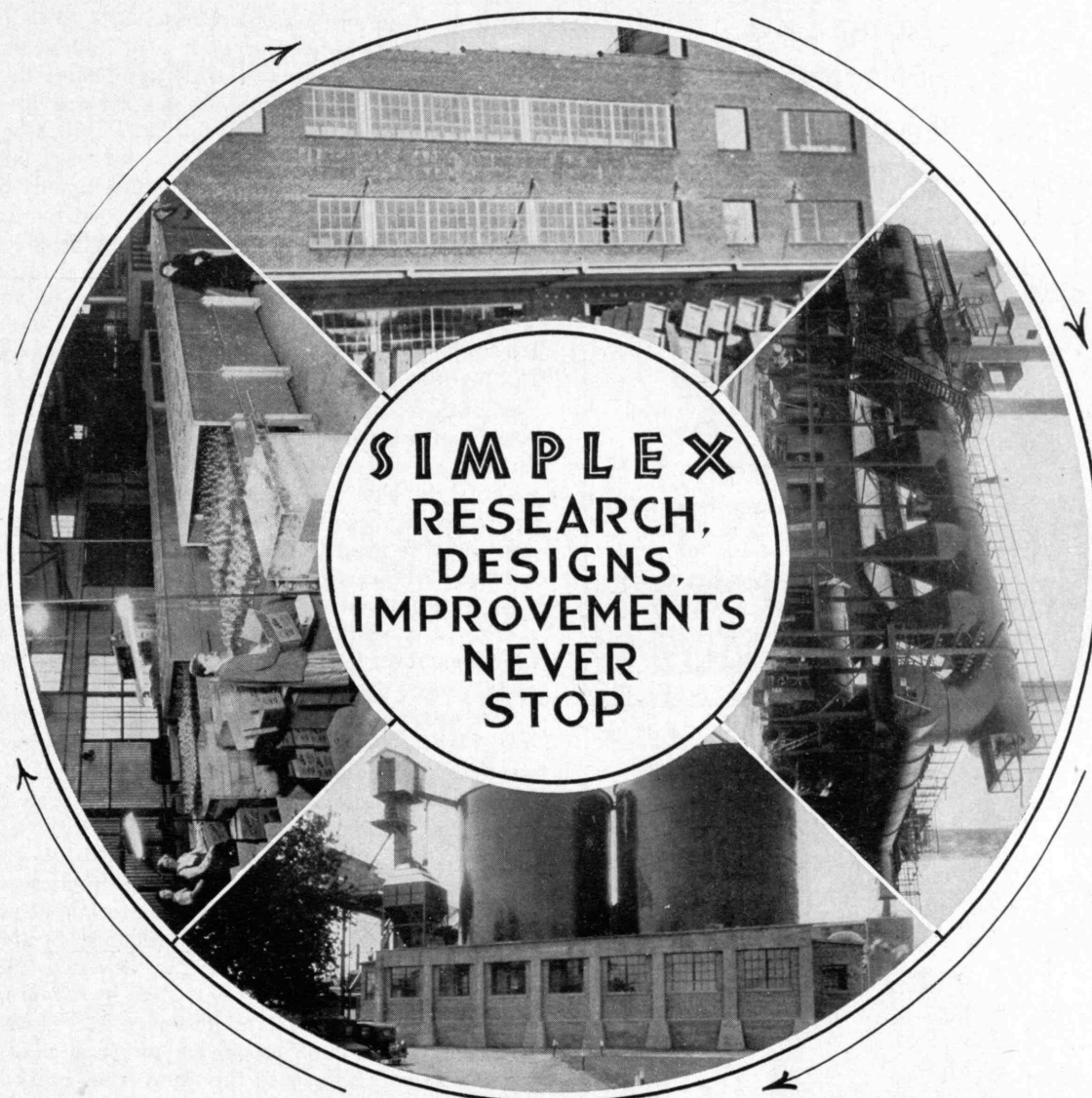
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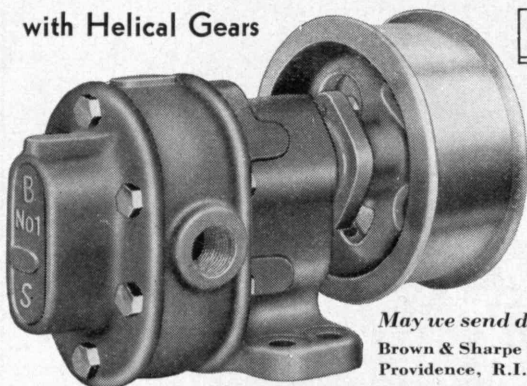
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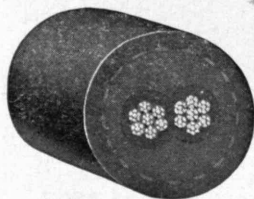


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TECHNOLOGY REVISITED

(Continued from page 296)

higher complexity of student life. The first dormitories were built 20 years ago; now resident students are divided about equally between the dormitories and the fraternity houses, with 640 housed in dormitories, including 140 residents of the Graduate House. A "5:15 Club" aids in enriching the life of the nonresident students. In the Walker Memorial, recreation facilities include the library, club and assembly rooms, and student activity rooms, besides the gymnasium and cafeteria. Publications have gained in number and in quality; and track athletics and 15 other varsity sports — pursued mainly for the good of the men participating rather than for competitive glory — have been advanced and bettered.

DURING the life of the Institute, two outstanding changes have occurred in American life, one physical, the other spiritual, and with both of these changes the Institute is intimately and presently concerned. The first of them, in direct importance, is the passing of the American frontier. For the most part, the limit of our natural resources is known; the end of some of them is definitely in sight. Hence conservation of the resources yet remaining becomes of critical urgency. This, in turn, demands the most thrifty use of those resources which are exhaustible, the most provident possible use of those which may be perpetuated, and the never-ceasing search for substitutes. For all of these ends, finer techniques and ever finer are demanded. Such techniques are objectives of the M.I.T.

The second change has to do with the spiritual outlook. When the sciences first began to know their strength, especially in the closing years of the last century and the earlier years of this, they prided themselves on their precision, their quantitative results. They tended, indeed, to insist that quantitative results alone were worth while. As a result, there crept upon philosophy a new mechanistic and material palsy, which deprived it of steadiness and self-reliance. Science now has waived these claims to be the universal tutor and the final arbiter of values: A new idealism is taking courage and finding strength. Philosophy is reasserting its rights as critic and reconciler of that many-sided knowledge which flows to the mind from every source.

America may well look forward to ever greater achievements in pure science. At the time the Institute began, those in this country who desired to sit at the feet of the masters were forced to go abroad. The universities as yet were wanting here; they could be found over there. It seems likely that more and more students now will feel free to enter these fields of study, in which the rewards are less to be measured in economic terms; for the bonanza days of industrial expansion have, for the time, passed by. If it be true, as doubtless it is, that America's major scientific contributions have taken the form of improved techniques rather than of new formulas in mathematics and physics, the reasons for this have already been set forth — the lack of higher schools and original minds, and the overpowering urge of practicality. Now, however, the schools are here, the discoverers are arriving. (Concluded on page 300)

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(Concluded from page 298)

It well may be, therefore, that the major services of Technology hereafter — beyond the prime objectives of effective teaching and inspirational guidance in study — will be in two principal domains: research, and origination in pure science.

One thing, assuredly, the Institute has demonstrated beyond all question: The very fullest cultural values are to be attained by a well-rounded science training, quite as much as ever they were through the old-time courses in liberal arts. This means that the research worker, the technician, the engineer, the architect, and the city planner — for whose discipline the Institute was created and will carry on — have brought with them into our modern life a vast fresh contribution of attainment and of character.

A change has come in evolutionary theory since Darwin's time, brought about less by speculation than by experience. Darwin saw variations as happening at random within a fixed environment. Today, with the progress of scientific technology and the coöperative social use of its instrumentalities, the environment has been found to be plastic under human intelligence and will. This fact, as Dr. Alfred N. Whitehead has pointed out, "alters the whole ethical import of evolution." Man is not mechanistically constrained merely to accept his world; he may control and adapt it. This great gain is due mainly to such accomplishments as those in which Technology holds leadership.

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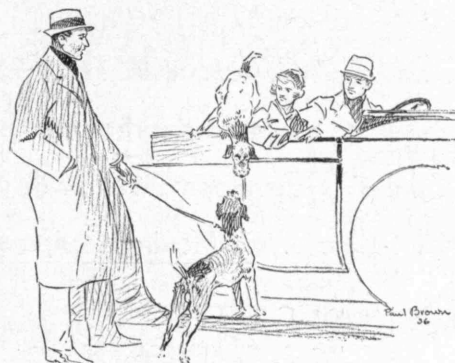
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The Institute publishes a variety of bulletins, as well as a catalogue of general information essential to the entering student. The Technology Review Bureau will be glad to send, gratis and post free upon request, one or more copies of any publication listed below, or to forward any special inquiry to the proper authority.

Ask for the following pamphlets by their descriptive numbers

1: For general information, admission requirements, subjects of instruction, ask for Bulletin 1.

2: For announcement of courses offered in Summer Session, ask for Bulletin 2.

3: For information on courses in Architecture, both Undergraduate and Graduate, ask for Bulletin 3.

4: For a popular presentation of Educational Opportunities offered at M.I.T., ask for Bulletin 4.

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STYLE vs. SAFETY

(Continued from page 277)

and aft, and up and down. The angles of the seat and back cushions should be adjustable. There is no reason for making the driver's seat and the front passenger's seat alike; they have different uses.

An adjustable and telescoping steering post is fully as important for the driver as is an adjustable seat. Incidentally, all adjustment mechanisms must be made strong and durable. An adjustment that comes adrift may cause a serious accident. In too many cases the door handles, gear-shift levers, windshields, and dashboards interfere with steering. Pedals are often so closely grouped that they cannot be quickly operated.

High, long engine hoods prevent proper traffic vision; low roofs and rounded bodies cause blind spots at the windshield pillars; low roofs make high traffic lights difficult to see; low seats and low roofs make rear vision so limited that reversing a car becomes an adventure instead of a properly controlled maneuver.

Windshields that are steeply inclined and have no outside protecting visors cause glare and eye strain, especially when lightly coated with dust or dirt. Such windshields are practically impossible to defrost. Vee windshields cause confusing reflections in night driving in the rain. The present bodies with rounded roofs and tumble-home windows allow disagreeable quantities of rain to enter the bodies if the windows are opened. In order to keep dry, the windows are kept closed and with improper ventilation, the driver becomes sluggish in his thinking and actions. Low seats and small windows discourage the use of hand signals. Automatic semaphore signals, such as are compulsory in some European countries, would do much to remove this hazard.

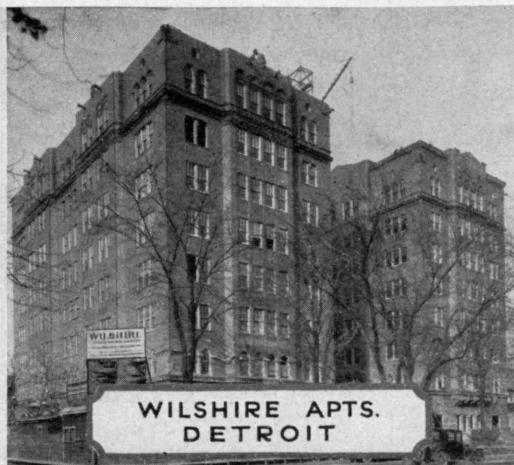
The present style in rounded and sagging running boards creates a slippery and dangerous surface when wet or icy. A nonskid running-board cover would add to safety in entering and leaving cars. A driver who has been bruised getting into his car thinks more about his pain than about his driving.

Motor vehicle safety demands that we consider cars not only from the new-car standpoint; we must also visualize what the hazards will be after the cars are five or seven years old and have had little maintenance. Some of our present cars with flimsy exhaust systems (made of light material that will rust through quickly and so placed that they can be damaged on bad roads and on ramps) and with vacuum ventilating systems may be expected to become decidedly dangerous in a few years.

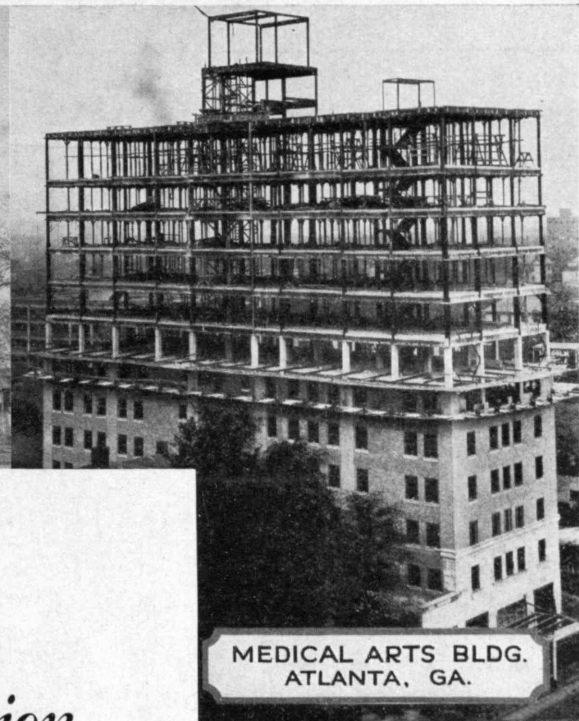
Further safety improvements may be suggested briefly as follows: A car should be kept in proper "tune" at all times; ignition systems should be improved and made to last longer without adjustment; weight distribution should be shifted to decrease risk of skidding; shock absorbers should be made more robust; body level should be raised. In the present low-swung cars child passengers have to stand or kneel in order to see out; they often obstruct the driver's view, and in sudden stops they may be thrown to the floor. In (Concluded on page 304)



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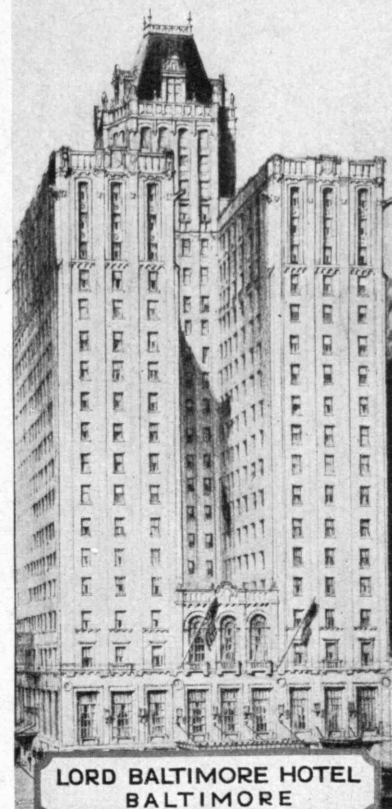
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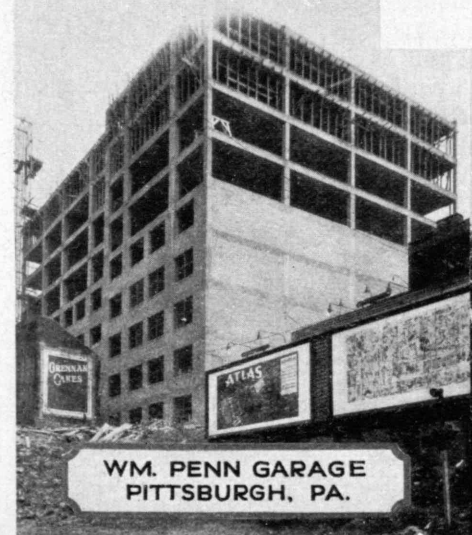
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BIRMINGHAM, ALA.

STYLE vs. SAFETY

(Concluded from page 302)

too many cars the use of tire chains is discouraged by the mud guards and wheel housing, while on some cars tire chains cannot be used at all.

On cars where headlights offer the most convenient purchase when pushing, the lights must be firmly mounted so as not to be shifted from proper adjustment. Improperly mounted bumpers can become a great source of danger. Ornamental bright work often causes reflections in the driver's eyes, temporarily blinding him.

Let it be granted that style has powerful sales value. When, however, style tends to reduce the safe operation of such a potentially dangerous weapon as a fast motor car, that style must be curbed. If cars are produced which are relatively safe when new but will in time become unsafe, the motor industry will later have to suffer for its present haste and lack of foresight.

TREND OF AFFAIRS

(Continued from page 264)

its ominous head in more than one place, particularly in bituminous-spreading equipment, where the manufacturer states it results in a lowered center of gravity under full load, and in steam-shovel cabs, where the makers seem a little confused as to why they have it after all. Probably most significant of all the developments and certainly the most surprising to the layman is the rapid replacement of gasoline-powered units by Diesels. Though oil and distillate motors are by no means wiped out, almost all of the big shovels, most of the tractors, portable compressors, and even some of the other apparatus have gone over to the Diesel, which is, of course, economical, dependable, and relatively long-lived.

Most of us are familiar with the elaborate concrete-spreading machine which moves on rails and lays a 10-foot strip of concrete on the base, doing most of the surfacing simultaneously. Increasingly rigid specifications have forced better control of mix and mixing and have resulted, therefore, in an astounding number of precision weighing and measuring devices, in apparatus for controlling time of mix, in great improvements in storage tanks, and in improved truck mixers. The most interesting development of this sort is in the small truck mixer, which from the behemoths of yesterday has been reduced to a tidy little unit that will move rapidly and cheaply and will carry one ton of concrete per trip. The highway makers, moreover, have kept abreast of the times, and recognizing the advantages of vibrating the concrete have developed two types of vibrators: one which works on the surface and one which digs deep into the mass.

Bituminous apparatus is in general adapted to spread almost any other kind of surfacing, notably stone, gravel, and the like. Usually it is divided into two types: the apparatus that distributes the material and the roller that compacts and smooths it. Nearly all rollers now have a third wheel for touching up the surfaces. In size they range from one about the size of a decent locomotive, a roller which uses an ordinary three-ton roller such as we usually see for (Continued on page 306)



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TEN years ago a group of men with ideals in their heads and courage in their hearts launched an enterprise that was to record, in the short span of a decade, one of the most colorful success sagas in the history of the American automobile industry.

Launched in the highly competitive era that preceded the depression, the new project was destined to face the most tremendous obstacles that ever beset an infant undertaking. For here was an industry that was already overcrowded—an industry whose leaders had so definitely established themselves that success for a newcomer seemed beyond the realm of achievement.

* * *

Today Chrysler Corporation ranks among the Big Three of the automobile industry... and builds a line of motor cars whose names and high quality are bywords all over the world: Plymouth, Dodge, De Soto, Chrysler, and Dodge Trucks.

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To the men who make up Chrysler Corporation, a Chrysler-made car is something more than steel and iron. It is rather the culmination of ideals... the ideals of these courageous pioneers who, in 1925, dared knock at the portals of an industry that held little promise for a beginner.

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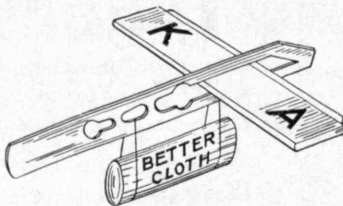
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RHODE ISLAND WARP STOP EQUIPMENT CO.
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TREND OF AFFAIRS

(Continued from page 304)

a chocking block, to a flock of small two-ton rollers for building the sidewalks that are steadily becoming a more usual part of highway development.

To the Caspar Milquetoast of the urbs or the suburbs, spreading equipment will never appear so strange or so awesome as the earth-moving equipment which has a certain resemblance to the power of the prehistoric. Curiously enough, although other pieces of earth-moving machinery are getting larger and larger, steam shovels are getting smaller. This is not because the steam-shovel boys cannot make a good-sized piece of apparatus, as witnessed by the 32-cubic-yard dipper recently produced for stripping coal in the Illinois fields. This dipper, made of a light-weight alloy, can be handled by the same shovel that used to wield the former record-holding 20-yard dipper. An automobile may be driven into it with ease. Dippers like this do not belong on the highway, though at times they might be convenient to lift the detouring motorist over a particularly difficult piece of mountain construction. The most recent shovel at the show had a capacity of two-and-one-quarter yards, whereas the three-eighth-yard shovels were most in demand, due to their light weight, easy transportability, and speed of operation. The larger shovels are getting faster too. Big ones are powered with Diesels which have usually not yet invaded (Continued on page 308)

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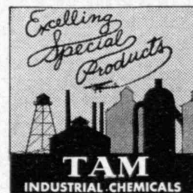
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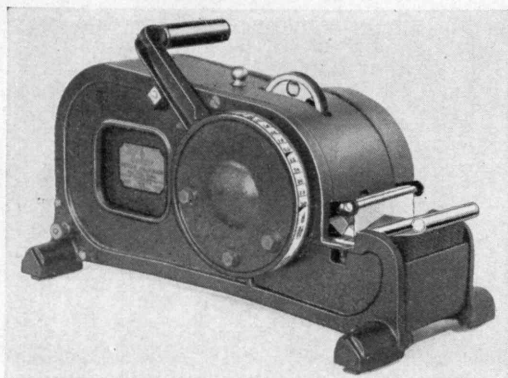
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TREND OF AFFAIRS

(Continued from page 306)

the small field although there was a three-quarter-yard Diesel-powered shovel and also a three-eighth-yard shovel which was operated by a Diesel tractor. Some of the manufacturers are showing tubular shipper shafts on the large models (tubular jack booms as well) and this may be the outstanding shovel development of the year. Roller bearings are becoming general, as is the use of alloy-steel parts to reduce weight. Cabs tend toward greater enclosure against the weather. Some shovels have self-cleaning crawler treads, for the tire has not yet invaded the shovel field. Truck-mounted shovels seem to be gaining in importance because of their greater mobility, although the largest one yet shown has a capacity of only one three-quarter yard. A very interesting three-eighth-yard truck-mounted shovel with a single tubular boom and two tubular shipper shafts with power supplied by the truck motor, weighs only nine tons altogether.

Under the heading of trail builders, road makers generally include dirt-removing equipment of bulldozer type and others which, working on rough country, dig out the ground, move the earth, and regrade it. Bulldozers, as the name implies, attack the earth head on with a scoop pushed or pulled by a tractor, and the principal refinement (with one exception which may be dealt with later) comes in the design of the scoop which by one manufacturer has a crescent-shaped maw. On trail builders of various types the grader board is usually fastened to the frame through a swivel connection at the center and the side members are adjustable to permit angle grading. There is no settled practice for the operating of these in the new machines. Hydraulic control is most common, but one manufacturer instead of rigidly mounting its hydraulic cylinders sets them on a swivel on the side frame, thus utilizing the reaction of the cylinder thrust to lifting advantage, reducing the pressure required for blade operation, while another sets them in a vertical position whence they actuate a cradle frame. One of the interesting gadgets consists of a large cylinder that may be filled with water to add weight when in operation. Here it may act as a roller or, through the hydraulic jacks, be lifted above the bulldozer to increase the force applied.

By far the most spectacular of this kind of equipment, however, is the sheep's-foot roller which is really a tamping roller gaining its name from the shape of the pedals that protrude from its surface. This consists of two hollow, water-tight cylinders, four feet wide, to each of which are welded 112 sheep's-foot steel forgings, seven inches long. The cylinders as in the case of the bulldozer may be raised above the tamper and filled with water on volition. The tampers may, on the other hand, be used to augment the power of the rollers. Cleaning teeth keep the feet clear. An oscillating type has flexible couplings between sections better to conform to the ground. The feet of the roller penetrate the layer of dirt with a wedging or rodding action causing one layer to intermingle with another, thus really tamping from the bottom upwards. Under ordinary tamping the compression is greatest at the surface and *(Concluded on page 310)*

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TREND OF AFFAIRS

(Concluded from page 308)

Fire
 Marine
 Automobile
 Aircraft Damage
 Earthquake
 Explosion
 Rain
 Rents
 Riot and Civil Commotion
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 Tornado
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least at the bottom, which results in cleavage planes that the sheep's-foot is said to eliminate. Moreover, a bulldozer can be added to the front of the tractor which pulls this apparatus, resulting in a machine of many uses.

Wagons frequently equipped with loading devices get larger and larger and the dumping arrangements increase in flexibility and complexity. One 24-yard scraper will load in from one-half to one-and-one-half minutes. Another, also of 24-yard capacity, carries five buckets, one within the other; as these fill they are pulled back from the cutting edge until they form one long evenly filled bucket, the load always being pushed into an empty bucket to reduce resistance. The unit is 60 feet long from front of tractor to rear, or tire, and is completely cable operated. The biggest wagon shown was a 30-yard dump buggy, a trailer unit carried on four 18-inch by 24-inch tires at the rear and, in the front, resting on a Diesel-powered tractor with six of the same-sized wheels. A fixed curved plate forms the bottom of the wagon and the body may be tilted to either side for dumping.

This by no means exhausts the catalogue of unusual machinery often used but seldom seen. There are road sweepers, for example, which involve a combination of sweeper and blower, the sweeper removing the coarse material while the blower clears off the dust with air at the rate of 10,000 cubic feet a minute. Against this practice, other experts think that a vacuum device loading into an accompanying truck is better than a blower. Snow plows for the Middle West get bigger and better: One has three revolving spiral collectors that gather the snow and pass it into a high-speed fan blower that either throws it far to the sides of the road or delivers it into trucks. Such a device would be invaluable, for example, in northwestern Illinois, where snow this past winter has accumulated to such an extent that it will be impossible to pile any further fall on the sides of the road.

Even the careless observer of this show might conclude that the job of highway building has become complicated. Controversy ranges between builders and users as to the merits of various methods of doing things and the controversy reaches into more technical and scientific atmospheres every year. It is quite likely that the buyer of highway machinery today has a much more confusing choice to make than the buyer of motor cars. One of the curses of progress seems always to be complexity.

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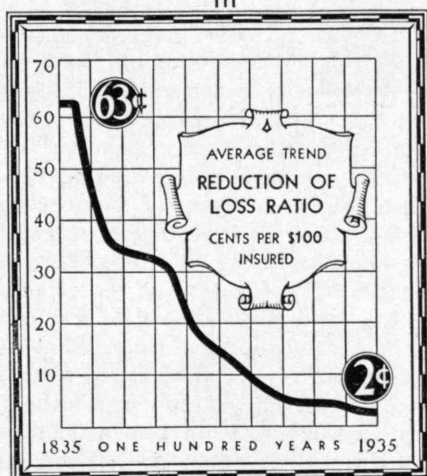
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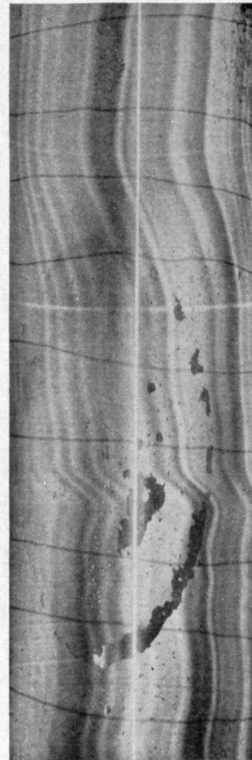
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WOLF'S CLOTHING

(Continued from page 275)



Picture of an unpolished, single-crystal, tungsten wire, taken by means of the electrons it emits. Sharp bands show the effect of the die marks on the emission. The broad, faint, dark bands indicate that certain crystal directions emit electrons less readily than others. Picture taken by R. P. Johnson and W. Shockley. Magnification 300 times

forces the emitted electrons to travel straight outward from the filament. The inner surface of the tube is covered with material which fluoresces when struck by electrons. Therefore, the fluorescent surface shows a replica of the surface of the filament on a greatly enlarged scale. The enlargement is only in one direction, around the diameter, and not along the length of the filament. Nevertheless, many important facts can be learned, for we actually can see the ability of the surface to emit electrons.

With an unpolished filament, markings can be seen corresponding to the die used in drawing out the tungsten wire. When filaments made of single tungsten crystals are used, it is noticed that some crystal surfaces emit many more electrons than do others. This should be elucidated more fully, for it must be remembered that, although the filament is one single crystal, it is drawn and polished into cylindrical form. What should be said is that more electrons are emitted from some parts of the cylindrical surface than from others and that the resulting picture on the surface of the tube has a symmetry which is directly related to the symmetry of the tungsten crystal. When caesium vapor is introduced into the tube, we can actually watch the formation of a caesium film on the tungsten; as those parts of the surface covered by caesium emit many more electrons and, therefore, show more brightly in the enlarged picture. It is noticed that the caesium prefers certain portions of the filament surfaces over others, and that these preferred portions also bear a simple relation to the underlying tungsten crystal. Much has been observed which is not understood as yet but, *(Concluded on page 316)*

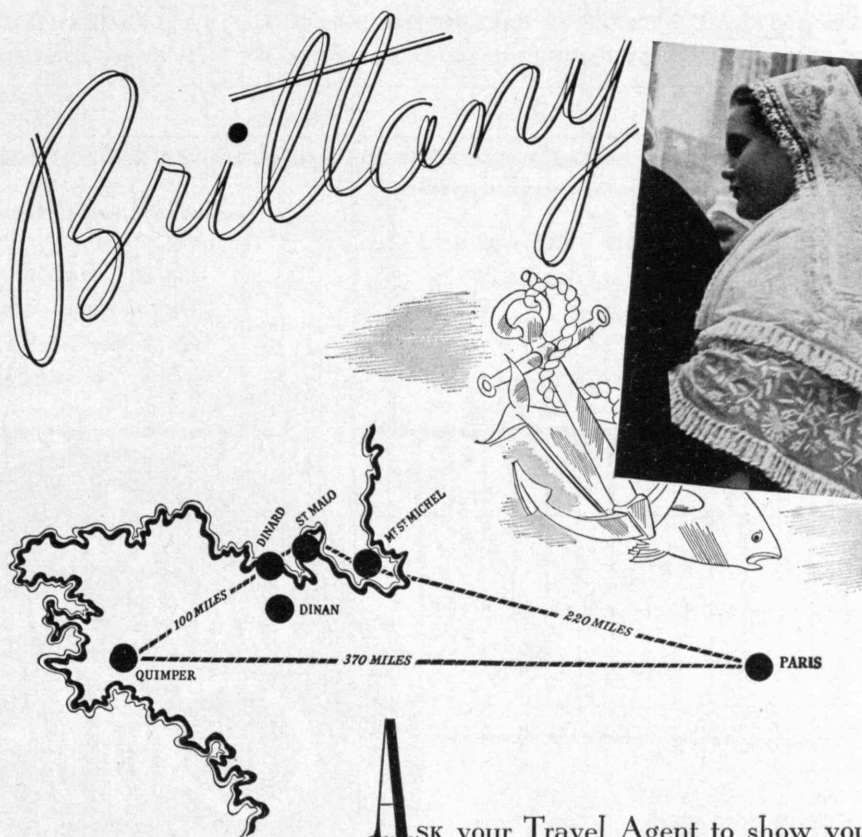
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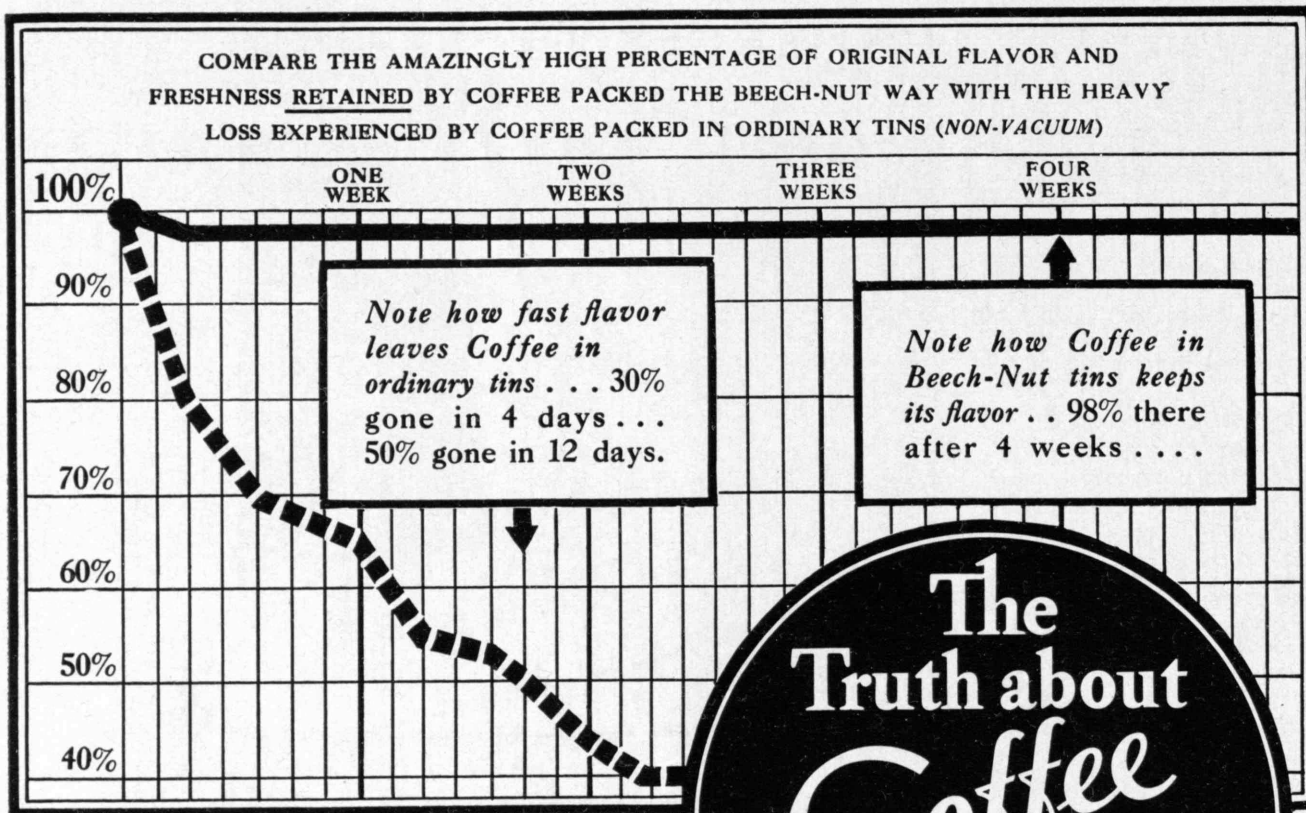
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Beech-Nut Coffee



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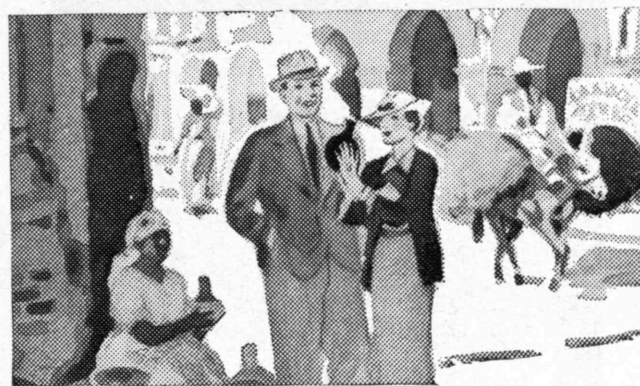
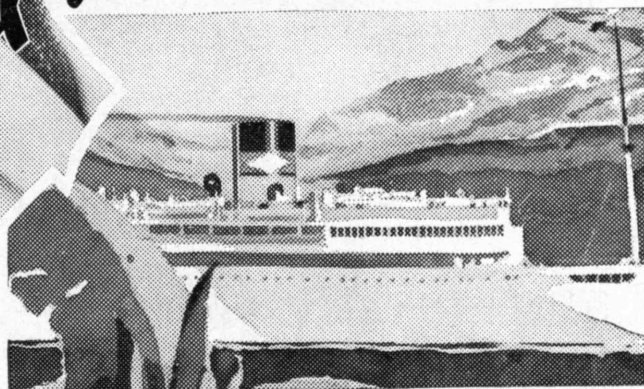
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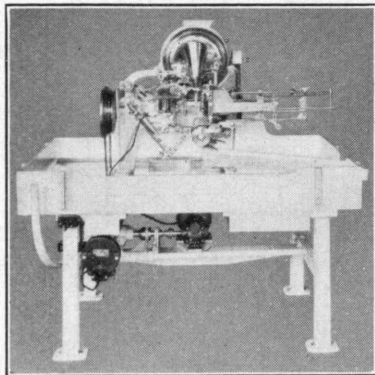
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WOLF'S CLOTHING

(Concluded from page 312)

after all, the apparatus has only been in use since last summer; undoubtedly fuller understanding will come with further observation.

These are some of the methods for studying surface effects which have been developed in the past few years. By their use, many of the intricate phenomena of surface behavior will be elucidated and many practical applications will be discovered.

PROFITS IN A VACUUM

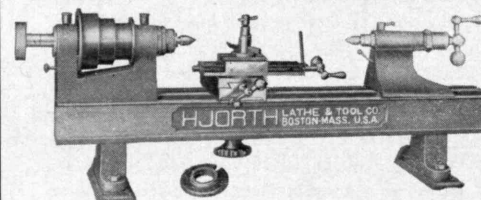
It is interesting to notice that many of these methods use high-vacuum technique. This is one of the reasons they have not been developed before, for until a few years ago it was a considerable achievement to maintain a high vacuum even in a small glass bulb. Now, however, in Professor Harrison's vacuum spectograph, in the vacuum evaporation furnaces of Professor Wulff, and in Professor Van de Graaff's vacuum high-voltage generator, volumes of 1,000 cubic feet and more can be maintained at low enough pressures so that molecules of the remaining gas inside the vessel strike the containing walls three or four times more often than they strike other molecules. At this rate it should not be long before high-vacuum methods, with their perfect control, can be used in industry to produce surfaces of any desired property.

We have in the foregoing material an interesting example of the acceleration of engineering practice. Formerly a new phenomenon or technique was known in the laboratory some 20 or 30 years before it came to be used in engineering practice. At present, things develop so rapidly that the physicist has to keep on the run to prevent being called an engineer!

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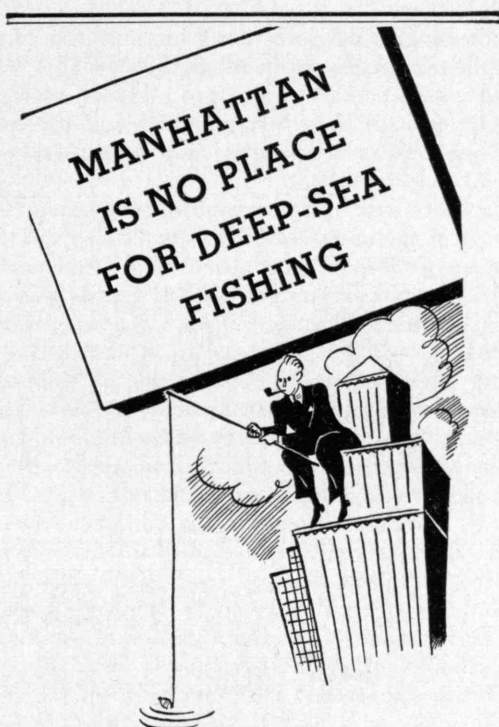
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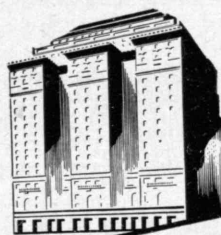
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THE INSTITUTE GAZETTE

(Concluded from page 288)

scientific education, they will furnish a strong motive for young men to go to the Institute and to do their best while there.

"In forming this Association then, and in organizing it, we must keep clearly in mind the fact that we are engaged not so much in a work of pleasure as of duty, and that our aim is to help progress and to advance science by increasing the efficiency of that school to which we owe so much."

Plans were made at this organization meeting to hold a meeting of the new Association on January 27, 1876. At this meeting and dinner, the first officially held by the Alumni Association, Professor Richards was again elected president, I. S. P. Weeks, '71, vice-president, Charles R. Cross, '70, secretary and treasurer, Messrs. C. Frank Allen, '72, and F. H. Williams, '73, members of the executive committee. In opening the after-dinner exercises at this meeting President Richards said:

"We are here met together to inaugurate the first annual meeting of the Alumni of the Institute. It behooves us therefore to consider for a moment what are to be the privileges and capacities of this Association.

"In the first place, it seems to me that this is the best place for free discussion that the Institute possesses. In the Government of the Institute and in the Faculty, our speech and actions, and even our views and motives are oftentimes controlled and modified to suit the policy of the Institute or to avoid clashing with other departments. . . .

"Now let us see what advantages we possess for scrutinizing the ways of the Institute. We have most of us viewed the Institute from the standpoint of an applicant for admission, afterwards as undergraduates, then as graduates, and now many of us as business and professional men.

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"To be sure, in the beginning of our acquaintance with the school our views were mostly selfish, and we asked only the question, what can the school do for us? Now our thoughts are wider, and we not only ask the question, what has the school done for us, but also, what can it do for the country?"

One of the first important activities of the Association was the formation of a committee on the school in 1877. This committee by its active interest in the policies of the Institute exerted a powerful influence in shaping the Institute's educational procedure. The Association also conducted a successful campaign to have the Institute hold graduation exercises.

The Corporation of the Institute contained no Alumni members until 1878, when the Association at the request of the Corporation nominated Howard A. Carson, '69. Four years later, the Association selected another corporation member, Francis H. Williams, '73, and in 1883 a third candidate, James P. Tolman, '68. Dr. Williams became an original member of the Corporation Executive Committee and served in that capacity for 25 years. It was not until 1906 that the Association began each year to nominate alumni for the Corporation.

The Association set up the Institute's first Bureau of Employment in 1893 and prepared the first Alumni Register in 1876. The Council was established in 1909.

Throughout its history the Association has demonstrated a constant devotion to perpetuating high standards of education at the Institute and to enriching Institute life. The Council was instrumental in establishing the present system of Alumni Advisory Councils for Undergraduate Activities. The Association has many times come to the financial aid of the Institute. The occurrence that probably did more than any other single thing to weld the Alumni together was a move in the early part of this century to merge the Institute with Harvard. The opposition of the Alumni Association to this merger was a powerful influence in preventing it. The Association was instrumental in founding two Institute courses.

This catalogue of alumni accomplishments could be greatly extended but it is evident from those described that the Association has a record of achievement, of intelligent, restrained, yet fruitful loyalty to Technology, that commands our respect today and encourages our work for tomorrow.

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WHITHER BOUND?

(Concluded from page 268)

Conclusion. If these forecasts do not entirely miss the mark, they offer both encouragement and guidance in our efforts to make the Massachusetts Institute of Technology of the future a preëminently strong and serviceable institution. Above all, they indicate that the *criterion for survival of a private institution will be that it offers a quality of education and public service, definitely superior to that obtainable in government-operated institutions.* This is the challenge of the future to those who administer the affairs of private institutions and to those who wish such institutions to endure as vanguard and bulwarks of a free and progressive social order.

Under these circumstances, do you not agree that there is no form of altruism for those who have found success and happiness in this generation which is more basic and effective for securing similar success and happiness to the next generations than the generous support of those private institutions which must maintain the leadership — if such leadership is not to be sacrificed under the pressure of finances or of fads? Assuming that you, as a reader of this magazine, are interested in technological progress and education, I would ask you to consider this question with special reference to M.I.T. If this institution does receive the support of its Alumni and friends, the quality of public service which it will render in the next 75 years may even exceed that of the past 75 years. In that event, at least one of my forecasts will have been verified.

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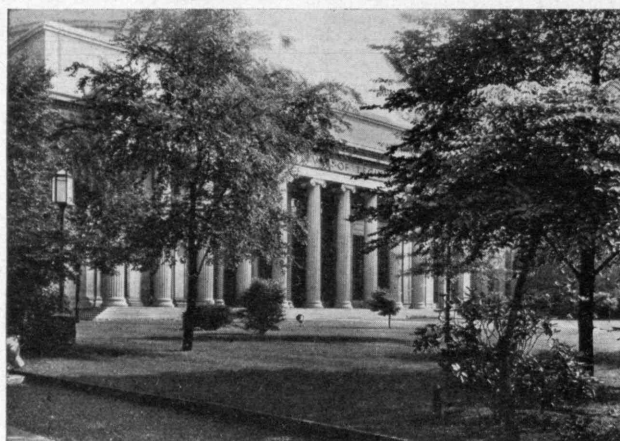
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New York City Administration

It is interesting to note the number of Technology men who hold municipal positions in New York City: *Department of Health*: GEORGE T. PALMER '09, deputy commissioner, doctor of public health; THOMAS J. DUFFIELD '14, registrar of records. *Department of Parks*: FENWICK F. SKINNER '93, senior draftsman; ALEXANDER G. NICHOLS '22, senior draftsman; ARTHUR F. ROGERS '22, supervising landscape designer; LEONID G. SHAH-NAZAROFF '23, senior draftsman; WILLIAM H. LATHAM '26, consulting park engineer; MICHAEL L. RADOSLOVICH '26, supervising draftsman; EDMUND I. KARP '27, senior draftsman; SAMUEL R. WEIBEL '28, supervising draftsman; JOHN J. BYRNE '30, assistant engineer of construction; FRANCES J. SWARTI '30, senior draftsman; MARGARET V. VAN PELT VILAS '30, senior architect; GEORGE H. RABSON '33, rodman. *Department of Sanitation*: ROBERT S. ALLYN '98, deputy commissioner in charge of division of administration; RICHARD H. GOULD '11, chief engineer, bureau of sewage disposal and intercepting sewers; WALTER D. BINGER '16, deputy commissioner in charge of division of engineering. *Department of Water Supply, Gas, and Electricity*: WILLIAM H. CORREALE '24, deputy commissioner in charge of Queens office. *Department of Plants and Structures*: ISAAC BRIMBERG '24, radio engineer, municipal broadcasting station, WNYC; EDWARD J. MCGREW, JR., '26, first deputy commissioner.

Written

□ By AUGUSTUS H. GILL '84, the fourth edition of "Power Plant Chemistry," McGraw-Hill.
□ By ELMER A. HOLBROOK '04, "Changes in Mining Education" in the *Journal of Engineering Education*, February.
□ By LELAND C. ROBERTS '17, an article entitled "Balance in Railroad Dispatching Circuits" in the February issue of *Bell Laboratories Record*.
□ By THORNDIKE SAVILLE '17, an article, "Water Resources Studies," *Engineering News-Record*, February 6.
□ By F. ALEXANDER MAGOUN '18, an article, first delivered as an address before the New England Section, So-

ciety for the Promotion of Engineering Education, "The Aims and Techniques of Teaching," *Journal of Engineering Education*, February.

□ By G. ROBERT KLEIN '32, an article "Does Planned Promotion Pay?" published in *The S-M "News"*, January.

□ By FREDERICK G. FASSETT, Staff, an article, "Rhetoric I," in *The English Journal*, December.

□ By ERNEST F. LANGLEY, Staff, a book, "Romantic Figures in Pen and Color," Harvard University Press.

Recognition

□ To ARTHUR C. WILLARD '04 on receiving the F. Paul Anderson Gold Medal of the American Society of Heating and Ventilating Engineers, for "work as an engineer, teacher, author, and consultant on the ventilating systems of the Holland Tunnel, the United States Capitol, and the proposed Chicago subway."

□ To CHARLES A. KRAUS '08 on receiving the Theodore William Richards Medal of the Northeastern Section, American Chemical Society, for "conspicuous achievement in chemistry."

□ To JAMES F. NORRIS, Staff, on completing 11 consecutive years as director of the American Chemical Society, during which time he has been of great value to the board and has rendered devoted service to the Society.

In Print

□ Because he recently retired from the Bell Telephone Laboratories after having had much to do with perfecting the long-distance telephone, GEORGE A. CAMPBELL '91.

□ Because ten years ago he started a movement for the building of telescopes by amateurs, RUSSELL W. PORTER '96.

□ Because he has been made a vice-president of the Phoenix Insurance Company, F. MINOT BLAKE '99.

□ Because he described a new blind-flying instrument to the Institute of the Aeronautical Sciences, LUIS DE FLOREZ '11.

□ Because he spoke at Princeton on "Liquid Gases as Refining Agents in the Petroleum Industry," ROBERT E. WILSON '16.

□ Because he has been elected vice-president of the McCall Company, MARVIN PIERCE '18.

□ Because he presented a cost analysis of the possibilities of mass production of airplanes to the Institute of the Aeronautical Sciences, THEODORE P. WRIGHT '18.

□ Because he was elected first vice-president of the Children's Museum in Jamaica Plain, Mass., FREDERICK K. MORRIS, Staff.

DEATHS

* See class notes for account.

□ FREDERICK GUILD '73, February 1.
□ EDWARD A. CUTLER '79, February 19.

□ HERBERT C. GRANT '79, February 24.

□ NEWTON M. ANDERSON '81, February 2.

□ DAVID S. BISSELL '81, December 31.

□ EDMUND MACKINTOSH '83, February 17.

□ CHARLES R. RICHARDS '85, February 21.*

□ ALBERT H. CHADBOURNE '86, February 13.

□ FRANCIS G. DANIELL '86, February 12.

□ HIRAM P. MAXIM '86, February 17.

□ ARCHIBALD MCCOLL '87, December.

□ CHARLES A. PROCTOR '87, February 8.

□ CLIFTON A. HOWES '94, February 6.

□ FRANK A. BOURNE '95, February 15.

□ ARTHUR B. SHEPARD '95, February 4.

□ DURAND CHURCHILL '98, September 11.

□ CLARA E. GARY '98, February 15.*

□ GEORGE A. HUTCHINSON '98, November 27.

□ T. FREDERICK E. REARDON '00, February 15.

□ CARL ROSSMASSLER '01, December 28.*

□ GEORGE P. O'CONNELL '02, January 3.

□ ROBERT B. MORSE '04, February 1.

□ LAURANCE D. CHAPMAN '09, February 23.

□ WILLIAM A. CROSBY '17, February 19.

□ PETER S. BURNS, former staff member, February 17.

NEWS FROM THE CLUBS AND CLASSES

CLUB NOTES

Technology Club of Rochester

On December 5 we were pleased to have as our guest for dinner Professor William H. Timbie. After dinner, which was also attended by the executive committee of the Rochester Section, American Institute of Electrical Engineers, we adjourned to the Rochester Engineering Society parlors to hear Professor Timbie tell how M.I.T. is making "Bigger and Better Engineers." Curiously enough he does not think too highly of Course I and XV engineers, but we feel he is just a wee bit prejudiced.

The annual undergraduate luncheon showed a record turnout, December 28. Of the 22 undergraduates living in Rochester, 16 attended, as well as 28 Alumni. Two of the undergraduates, Oliver Angevine '36 and Robert Reichart '37, gave talks on activities at Technology including such bits as the red automobile on the third floor of the D.K.E. house and the Frostbite fleet. John Ancona '03 outlined the progress of the Club. This meeting is fast becoming one of the most interesting events in the Club calendar. In many respects we obtain a certain insight into Technology activities that our more seasoned guests pass lightly over. These are the direct cause of much speculation and reminiscence which keep alive some of our happiest moments.

This year the Club made a bid for social fame by presenting its first alumni prom on February 8 at the University Club. Twenty-two couples gathered around a large T-shaped table, very beautifully decorated with streamers of red Kodapak, bowls of red carnations, and twigs of pussy willow, which brought out the cardinal-and-gray color scheme. After dinner Darrell Gifford's orchestra played for dancing, and the party was augmented by several other couples who arrived after the theater. The committee in charge consisted of L. L. McGrady '17, H. R. Couch '20, D. B. Kimball '20, E. P. Kron '34, Andrew Langdon '22, and Robert E. Smith '33. — E. PHILIP KRON '34, Secretary, Building 23, Kodak Park, Rochester, N. Y.

M.I.T. Association of Cleveland

The place of our last meeting, held January 6, is rather unique in that the Leisy Brewing Company have cleaned out their old aging cellars and installed a bar and steam tables, dining tables, and benches. The number of steps in the circular stairway going down, the arched ceilings, dimensional proportions, and indirect lighting give the place lots of atmosphere. If you are fortunate enough to secure the room, it is furnished with a

bartender to draw all the beer the party can drink, but without food, which must come from an outside caterer. The men arriving at 6:15 had time for a beer or two before eating. Those who arrived very late, such as the writer, woke up to the fact that the number to get the whole dinner did not include the last six or eight to arrive. However, we did get soup, rolls, dessert, and beer. It was just one of those occasions when even the 10% allowance over the number sending in cards is not enough and the *rathskeller* is so situated that it is impossible to get more food on short notice. However, everyone was satisfied, for the Treasurer didn't dare to approach those who missed the meat.

Approximately 63 men showed up, and according to everyone the meeting was a huge success. After dinner, when all those who cared for it were comfortably settled with a fresh seidel of beer, the meeting was called to order by Carl B. Rowley '12, the retiring President. Reports were heard from the Secretary and the Treasurer, H. Seymour Colton '21 and Hank Steinbrenner '27. The nominating committee, of which Charles H. Reed '20 was chairman, read off their recommendations for the new officers, all of whom were unanimously elected: President, William L. Enfield '10, Director of Development, Incandescent Lamp Department of General Electric Company; Vice-President, Willard G. Loesch '21, Technical Director, Forbes Varnishing Company; Treasurer, Harry L. Moore, Jr., '32, Socony Vacuum Oil Company; Secretary, your humble servant, the undersigned.

The business meeting over, Mr. Enfield took the chair and the following talks were heard, each occupying 20 minutes to a half hour: Charles Reed, Vice-President of the Forbes Varnish Company, gave a talk on paint, which surveyed the industry as it is today and forecast some of the things which may be expected in the future. George A. Sackett '18 of the Goodyear Tire and Rubber Company, Akron, told us about the new developments in the field of rubber and showed samples of a new transparent rubber sheet material. Willard C. Brown '16 of the Incandescent Lamp Department of General Electric gave a talk, illustrated by lantern slides, on the recent progress made in street, highway, and other lighting. H. O. Schwartz of the Industrial Rayon Company told how rayon is made and demonstrated with laboratory apparatus. He had numerous samples of the various steps of manufacture and of the finished product. All the talks, everyone agreed, were very interesting and well given. It was generally felt that the plan of having several short talks worked well and should be tried again in the future. — DURYEA E. ELMENDORF '26, Secretary, General Electric Company, 1133 East 152d Street, Cleveland, Ohio.

M.I.T. Association of Buffalo

The Association had an Italian dinner at Lorenzo's Restaurant on January 29. It was a much debated question whether some of the members liked cheese with their spaghetti or spaghetti with their cheese. After the last elusive portion was properly twisted and downed, each one present gave a brief *résumé* of his activities since leaving Technology. The Ripley prize was taken by Austin Higgins '20 who was commissioned in all three branches of the service. In the wild game of roulette that followed, thousands of dollars in stage money changed hands with every turn of the wheel. Lieutenant Paul Warner '13 was ahead of the game for a long time and it was due to his early winnings that he was the last one to be bankrupt by the wheel.

Present were: Carl J. Bernhardt '28, John G. Brunner '34, Benjamin C. Buerk '30, Stanley Chmiel '22, Richard E. Dow '01, Whitworth Ferguson '22, Wilbur P. Foote '34, Marvin Gorham '93, Robert L. Hershey '23, Austin D. Higgins '20, Harold D. Mitchell '12, Calvin H. Mohr '33, Edgar M. Pierce '33, George P. Standley '27, Paul C. Warner '13.

At the conclusion of the meeting President Whitworth Ferguson '22 announced the committees for the dinner held here in honor of Dr. Compton on February 26 at the University Club: in charge of Dr. Compton: Marvin Gorham '93, N. Loring Danforth '01, Robert L. Hershey '23, Paul C. Warner '13; in charge of publicity, Austin D. Higgins '20; in charge of attendance: Calvin H. Mohr '33, Edwin C. Walton '28; dinner sponsors: Marvin Gorham '93, Edward B. Germain '13, John M. Gaines, Jr., '26, Austin D. Higgins '20, Theodore C. Jewett '16, Eugene L. Klocke '19, Roy W. Lindsay '07, Paul F. Mann '06, Aaron R. Merritt '08, C. Burrows Morey '06, Nathaniel K. Patch '01, Daniel F. Potter '92, Edward F. Strong '97, Paul N. Anderson '21 (Jamestown), W. Robert Barker '21, Malcolm C. Brock '17, Harry G. Brockington '25, Harvey M. Cushing '99, N. Loring Danforth '01, Richard E. Dow '01, George R. Duryea '17, Sylvester B. Eagan '06, John H. Earl '18, John G. Eppendorff '83, Whitworth Ferguson '22, Theodore Green '05, Frank R. Swift '99, John T. Walsh '15, Paul C. Warner '13, Edwin C. Walton '28. — CALVIN H. MOHR '33, Secretary, 1224 Cayuga Drive, Niagara Falls, N. Y.

Washington Society of the M.I.T.

At a meeting held December 20 at the University Club, the following were elected officers of the Society to serve during the year 1936: Harry W. Tyler '84, President; William K. MacMahon '22, Vice-President; John D. Fitch '24, Secre-

tary; Charles H. Godbold '98, Treasurer; Edmund H. Lloyd '33, Assistant Treasurer. Proctor L. Dougherty '97 continues to serve as Honorary Secretary by appointment of President Compton. F. W. Swanton '90 and Allen Pope '07 were appointed members of the executive committee.

Following the election of officers the meeting was addressed by Mr. C. S. Marsh, formerly educational director of the CCC who spoke on the organization and development of that group.

Among those present were: P. L. Dougherty '97, J. E. Nolte '98, A. B. McDaniel '01, H. W. Tyler '84, A. M. Holcombe '04, W. A. Danielson '26, J. D. Fitch '24, H. C. Morris '00, M. L. Harris '24, W. K. MacMahon '22, W. I. Swanton '93, M. S. Dickson '34, Garfield Riley '06, O. L. Hooper '23, R. H. Van Volkenburgh '20, W. B. Moore '28, M. O. Zigler '30, Allen Pope '07, Katharine Carman '33, B. E. Lindsly '05, N. D. Fitzgerald '31, F. W. Swanton '90, F. E. Fowle '94, C. A. Norton '20, G. W. Stose '93, A. F. O'Donnell '19.

A well-attended luncheon meeting, held January 17 at the University Club, was addressed by Dr. Harrison E. Howe, editor of *Industrial and Engineering Chemistry*, who spoke on recent developments in chemistry. The meeting was attended by: W. M. Corse '99, Allen Pope '07, H. W. Tyler '84, Katharine Carman '33, B. E. Lindsly '05, W. K. MacMahon '22, D. P. Allen '11, G. D. Mock '28, J. A. Plugge '29, J. G. Bowen '30, B. A. Howes '97, F. L. Ahern '14, W. E. Lutz '18, John Boyle '01, F. E. Fowle '94, A. E. Beitzell '28, W. I. Swanton '93, F. W. Swanton '90, E. W. Sann, Jr., '33, M. O. Zigler '30, C. A. Norton '20, J. D. Fitch '24, M. L. Harris '24, H. C. Morris '00, O. L. Hooper '23, F. S. Walters '35, N. D. Fitzgerald '31, W. B. Claflin '95, A. W. Greeley, Jr., '13, N. C. Grover '96, W. E. Swift '95, F. T. Schneider '92, P. L. Dougherty '97.

Mr. Dougherty reported the recent death of Dwight Clark '97 and read a letter from Mrs. Clark expressing her appreciation of the sympathy extended to her by the Society at the time of her bereavement. — JOHN D. FITCH '24, *Secretary*, 35 Montgomery Avenue, Kensington, Md.

Technology Club of Virginia

The Club held its first meeting of the year at the Westmoreland Club in Richmond on the evening of January 31. After a fine dinner some 35 Alumni settled back to enjoy the interesting program arranged by the steering committee. J. Scott Parrish '92, former President of the Club, introduced the speaker of the evening, Dr. Douglas VanderHorf, eminent Richmond physician and President of the Dartmouth Club of Virginia. Dr. VanderHorf spoke more or less extemporaneously on alumni clubs and their excuse for existence. He told us of the founding of the Dartmouth Club in this State and its operations and purposes, to illustrate what a real active alumni or-

ganization can mean to its Alma Mater. Pursuit of this theme led him into an interesting and enlightening discussion of the intimate details of the late George Eastman's philanthropies. It was later disclosed that Dr. VanderHorf was very well qualified to talk on this subject because of his own interest in the career of Mr. Eastman and the fact that he is the brother-in-law of Mr. Eastman's biographer.

After Dr. VanderHorf's talk, the Secretary's report was read and accepted as given, including the plan of reorganization proposed by the steering committee. This plan calls for a Technology Club of Virginia which will include all the Alumni in the State. The officers of this club will include a president, a secretary, an assistant secretary, and five vice-presidents, each of the latter to represent one of the five principal sections of the State. This parent club will meet at least twice a year, one of which meetings will be to elect the officers for the ensuing year. The plan further calls for the formation of local clubs in the five sections of the State to meet more frequently at monthly luncheon meetings or the like. A vice-president of the parent club will head each of these local clubs.

The Club then proceeded to elect the following officers for 1936: Donald N. Frazier '11, President; John J. Fahey '29, Secretary; Claude F. Machen '31, Assistant Secretary; M. W. Kennedy '33, Vice-President, Norfolk; Miles Cary '24, Vice-President, Richmond; Paul F. Swasey '19, Vice-President, Fredericksburg; Donald A. Holden '31, Vice-President, Newport News. The Mountain District representative will be elected later. The meeting closed with the showing of the film "Technology" and the singing of several Tech songs.

So far, the Newport News group is the only one that has made plans to organize. It is hoped that the others will be able to get started during this month. — JOHN J. FAHEY '29, *Secretary*, Care of Virginia Electric and Power Company, Richmond, Va.

CLASS NOTES

1877

Martin Gay was born, May 15, 1854, on Staten Island, N. Y., the son of Sidney Howard Gay and Elizabeth Johns Neal. He died on November 23 in New York City. His father was one of a long line of Gays in Hingham, Mass., and was at one time editor of the New York *Tribune*. With William Cullen Bryant he wrote the Bryant and Gay "History of the United States." His ancestor, Rev. Ebenezer Gay, was the third clergyman of the old Ship Church in Hingham. Martin Gay's early education was obtained on Staten Island and later he attended schools in Chicago, as his father was editing one of the papers in that city.

He was graduated from M.I.T. with the Class of 1877, a civil engineer, and soon after was employed in the engineering department of New York City in

charge of the construction and maintenance of the bridges over the Harlem River. He was very successful in this, losing no lives, a very honorable record. For a time he was employed in the water supply department and later in the park department. He retired from active work about 14 years ago. Two years later he wrote a history of the bridges of New York City which the Commissioner said was of great value.

Martin married Julia De Witt Stone, daughter of William Franklin Stone and Martha Young, September 18, 1895, at the Episcopal Church, West Brighton, Staten Island, N. Y., and they recently celebrated their 40th wedding anniversary. Two children were born: Martha Stone, September 5, 1896, and Elizabeth Neal, March 26, 1907. He inherited the old Gay mansion built by Rev. Ebenezer Gay and was much interested in gardening and fruit raising. His principal hobby was carpentry and cabinet work: He designed a piazza suitable for the old mansion and built it with his own hands. The burial was made in the family lot in Hingham, Mass. Martin is survived by his wife, two daughters, and two grandsons, Eben Gay Whiting and Martin Gay Pierce. He was the only member of the Class of '77 who died during 1935.

Our Class now has 29 living members and six whose addresses are not known. — BELVIN T. WILLISTON, *Secretary*, 3 Monmouth Street, Somerville, Mass.

1878

On January 15 the members of the Class had their reunion — the 58th — with Mrs. Charles M. Baker of Brookline, who entertained them at dinner and who asked Mrs. Emile F. Williams to foregather with them. Since the death of her husband, our only Class President, in 1918, Mrs. Baker has continued his custom of giving the annual dinner at her home on alternate years. At the time of our 50th — 1928 — Mrs. Baker was made an honorary member of the Class and joined us at the Commencement exercises of that year. Her gracious hospitality has done much to add to the joy of our recurring meetings. We welcome this opportunity to register our appreciation of her never failing loyalty and kindness to the Technology men of '78.

Allbright and Higgins are all who are left of that congenial crowd that have met together during all these years, now that Bacon (whom we do not relinquish to '77) can only send far-away greetings from the Dardanelles, and Longfellow, Rackemann, Rollins, and Williams are but memories. — ALFRED S. HIGGINS, *Secretary*, 246 Northern Avenue, Boston, Mass.

1882

Arthur Willis Walker, President of Walker and Pratt Manufacturing Company, died at his home in Malden, January 4, in his 75th year. He was born in Boston, the son of Hon. George Willis and Elizabeth Kennicutt Walker. He was educated at Malden High School, Chauncey Hall School, and M.I.T., where he

Plan to attend Alumni Day at M.I.T. on June 8, 1936

1882 Continued

was in the Class of 1882. While at the Institute he was the first editor of *The Tech*, the Institute's undergraduate paper, the first number of which bears the date, November 16, 1881.

Walker had resided in Malden the greater part of his life and in all of his years was associated with the Walker Pratt Company, founded by his father. Before becoming president of this corporation he was for many years its treasurer. Walker was of an inventive turn of mind and he patented many valuable improvements on stoves and furnaces; he founded and put on the market the Crawford ranges.

He was a former vice-president of the First National Bank of Malden and former trustee of the Malden Savings Bank. He served as member of the Malden School Committee for five years and was its chairman in 1913. He was a past district deputy grand master of the seventh Masonic district, a past master of the Converse Lodge of Masons and past commander of the Beauseant Commandery of Knights Templar. Walker was also a former president of the Malden Hospital, the Malden Y.M.C.A., and was a member of the First Congregational Church. He was senior past president of the American Foundrymen's Association, and a past president of the New England Stove Association. For many years he was active in the Technology Alumni Association. He also held membership in the Algonquin Club of Boston.

He is survived by: his widow, Mrs. Annie Dexter Walker; a son, Richard D. of Newton; one daughter, Mrs. James Kellum Smith of New York and New Hope, Pa.; a sister, Mary L., Baroness Van Heeckeren tot Walien, of Vevey, Switzerland; four grandchildren.

Arthur Walker is remembered by his classmates as a man of upright character with a fine sense of the good and beautiful. — ALFRED L. DARROW, *Secretary*, 39 Garrison Road, Brookline, Mass. RACHEL P. SNOW, *Assistant Secretary*, Pin Oakway, Falmouth, Mass.

1884

The Class will be interested to know of the progress of the Tyler Portrait Fund. The committee is much pleased and gratified to state that sufficient funds were in hand within a week to assure the success of the undertaking. The necessary sum has been raised, and Isaac B. Hazelton '94, selected as the artist. He painted a most satisfactory portrait of President Crafts.

The Tyler portrait will be hung in the Mathematics Department room and will be in place by Alumni Day, June 8. — AUGUSTUS H. GILL, *Secretary*, Room 4-053, M.I.T., Cambridge, Mass. S. S. DEARBORN, *Assistant Secretary*, 4 Newport Road, Cambridge, Mass.

1885

We regret to report the death of Charles R. Richards on February 21 at the age of 70, after an illness from which he had suffered for several months. We quote from the *New York Times* of February 22:

"Professor Richards, after many years spent as a teacher, devoted his life to making the general public aware of the interrelationship of art, science, and industry. The New York Museum of Science and Industry, which he helped to establish as executive vice-president, presented in tangible form his ideas of the linking of science and industry served by art. In explaining the objective of the museum he once said: 'The processes of production that underlie the civilization of today are hidden behind factory walls, where only the specialized factory workers enter. To attempt to present these things through books is unsatisfactory and tame. The processes must be revealed to the eye and set forth in the simplest and clearest possible fashion if the foundations of our present-day life are not only to be understood but to become an element in the culture of today.'

"Professor Richards was born in Boston on June 30, 1865, the son of Charles C. and Josephine Gleason Richards. He was graduated from M.I.T. in 1885, and became, three years later, director of the department of science and technology at Pratt Institute, Brooklyn, serving for ten years. During the decade, 1898 to 1908, he was director of the department of manual training at Teachers College, Columbia University.

"He was director of Cooper Union for the next 15 years and then turned to the field which occupied his time to the end. He was director of the American Association of Museums from 1923 to 1926, and thereafter director of the division of industrial art of the General Education Board until 1930, when he left to take over the position in the Museum of Science and Industry made possible by the bequest of Henry R. Towne.

"Professor Richards found time to serve as a special investigator of the State Department of Labor and as a member of the advisory committee on industrial education of the Board of Regents. He also conducted industrial art and museum surveys. He published a survey of art in industry and a study of important industrial museums abroad. He felt that this country lagged behind Europe in respect to its facilities for displaying the advances in applied art and conducted constant missionary work in speeches and articles to win converts to his viewpoint.

"Professor Richards was sent to Europe by Herbert Hoover, then Secretary of Commerce, to visit the International Exposition of Modern Decorative and Industrial Art at Paris in 1925 and to report to American manufacturers. He was made a member of the French Legion of Honor for this service. He was a member of the American Society of Mechanical Engineers and was president of the National Society for the Promotion of Industrial Education in 1909. He had been vice-president of the American Association of Museums since 1927, was a trustee of the Children's Aid Society from 1904 to 1916, and a member of the Corporation of the M.I.T. from 1909 to 1914. His clubs included the Century, Technology and Art in Trades.

"He had published 'Art in Industry,' 'The Industrial Museum,' and 'Industrial Art and the Museum.' — ARTHUR K. HUNT, *Secretary*, 145 Longwood Avenue, Brookline, Mass.

1888

Back in the early years of our Class some of us who were athletically inclined will remember rumors of a coming Technology track meet at Lynn. Your Secretary did not go, because Lynn was a long way off and distance running was too strenuous for him who nearly expired after trying to run a half-mile race on the Y.M.C.A. indoor track. However, there was in the Class a "young Lochinvar come up from the" South, by the name of George W. Roper, a "civil" from Norfolk, Va., who could and did run a mile in record-breaking time. To get to the real thrill of that "Mile Run at Lynn" we will let the winner tell the story in his own words: "I was let into the secret that there was going to be a mile-run competition between the classes at Lynn just a day or two before the event was scheduled to take place. Some of our class members called upon me at my room one evening and urged me to forego some work I had planned to do on that day at Middlesex Fells in order to take up the banner of our Class in the mile run. I had never attempted an out-of-door mile run or any other sort of run, but I had kept myself quite fit at the Y.M.C.A. gymnasium on Boylston Street where I usually ran five miles on the track each night. I was unacquainted with the Lynn track, of course, and with the ways of runners.

"I arrived on the scene of action with my sole backer, Harry Horn, in time to find my several competitors in their snappy running togs with friends to rub them down and all that sort of thing. I had on my gymnasium suit and slippers. I was told that a silver medal would be given the winner of the race. I do not recall the number of entrants, but think there were six or seven in all. We had a gray sky, a raw wind, and a fair audience to watch the events.

"We were to start at the crack of a pistol which misfired at the first trigger pull. Looking for a repetition, therefore, I got off a little after the others. However, knowing no better, I ran my best speed and soon was in the lead on the first lap. (There were three laps to the mile.) I had told Harry Horn I intended to do the laps at one-and-one-half minutes each and asked him to hold up his hand if I were under that mark. At the end of the first lap his hand was up; I was well ahead. On the second lap, I noticed some of the runners had dropped out; I continued my lead and found Horn's hand up at the end of this lap. On the last lap, I noticed several runners had dropped out, and by the time I had gotten half way around I saw that I was alone. The pace and raw wind had gotten the best of my competitors. Seeing I was without competition I slacked my pace, as the silver prize was already in my grasp. It was at this time I noticed a man speeding towards me from the grand stand

1888 Continued

on one of those old-fashioned high-wheel bicycles. When he reached me he said: 'Don't slacken your pace as you may get the state record.' I had, of course, already lost valuable seconds due to lack of competition to spur me onward. Nevertheless, I renewed my pace and did get the gold medal for state record. I have the medal in a safety deposit box, but I have forgotten the number of seconds over four minutes that were consumed in the running. That was my first and last official run."

That spirit of being out in front seems to have followed our classmate Roper through life, witness the following: "From Boston I went, in 1888, to North Carolina, there to engage in the lumber business and also to construct a railroad connecting the Albemarle and Pamlico Sounds. This railroad was known as the Albemarle and Pantego Railroad and extended from Mackey's Ferry to Belhaven. The writer founded Belhaven, gave it its name, and built the first house in what we hoped would some day be a town. It is now a sizable one. At Belhaven we built wharves and inaugurated steamboat service to all tributaries of the Pamlico Sound. At Mackey's Ferry I designed and built a transfer bridge for handling cars by a barge ferry across the Albemarle Sound to Edenton, N. C. We also had passenger steamer service on this same run.

"Nearly half of the mileage of the Albemarle and Pantego Railroad was through a deep swamp which has the character of the great Dismal Swamp of Virginia. One could thrust a pole down into its peaty bottom, 12 to 16 feet. Owing to the high cost of any other construction, I decided to adopt the corduroy-road idea and used the felled timber of right of way over this 15 or more miles. The base of the railroad through this swamp was made of heavy tree trunks, 25 feet or more long, laid at right angles to the axis of the railroad; on top of this base other heavy and less perishable timber was laid parallel to the axis of the railroad, notched and leveled approximately to receive the railroad ties. Over this railroad we maintained train service, while for three years we hauled in dirt filling to cover the corduroy completely. Strange to say the upkeep on this 15 miles of track was less per mile than on any other part of the railroad. . . .

"During the period 1906 to 1910 I designed and erected the large saw and planing mills located at various places in North Carolina and Virginia. So much for the lumber business (which seems to be going to the dogs). As to the New Deal, don't ask me, ask Al Smith; he seems to have heard all about it. . . .

"I spent three or four months last spring in Europe: in England and Scotland, motoring much of the time; motored through Belgium and Holland; attended the flower show in Holland; spent seven weeks in Paris where I have relatives and many friends; went to Geneva, Aix-les-Bains, and so on. We had the pleasure of attending the wedding of one

of several French girls I had educated; in fact she postponed her marriage until her *parrain* could be present. The ceremonies, including wedding breakfast, dancing, and so on, lasted from 11 A.M. until 7:30 P.M. Only French was spoken, of course. It was a wonderful affair. We got to know quite a number of new friends among the French people and were beautifully entertained by them in their homes. I can say this much for the French people: I have never seen greater gratitude expressed than has been shown to me by those whom I have helped and also by their friends, as well as relatives. . . .

"On my first trip to Egypt I had the pleasure of going into 'Tut's' tomb and saw his unopened sarcophagus of rose quartz; by special permission secured through friends at Cairo, our party, I think, was the only one that had this privilege."

Our 210-pound, "all-America football guard," Frank M. Ladd, in a practice game in 1887 picked up your Secretary (167 pounds), carried him "like a baby" for 25 yards, and banged him up against the grand stand in the Old Union grounds. Now Ladd has developed into a political economist capable of lecturing interestingly on the subject in any college. Just listen to him: "The only topic of conversation in Denver is 'Where are we going?' You can hardly realize that a New Englander in this city is a distinct species. As I look about me and talk with people in public life and other lines, I wonder if I am in America or continental Europe. I talked with a city father the other day about politics, business, and so on, and got the surprise of my life to find out that he was born in Russia and had not heard of the Constitution. All the local leaders are of continental European parentage and, worse still, we are flooded with Mexicans or Spanish Americans, as they would be called. They frankly say that we took the land away from them (which we did) in the first place and they are entitled to support. They work in the sugar-beet fields in the summer and live in the winter in the cities, off the New Deal. I have had faith that the common sense of the American people would finally pull us out of this mess, but the American people are not running things as they did, so my faith is waning. I don't know the answer, but live each day as it arrives, have good health, walk three miles daily, and drink only ozone, as the whiskey is too poor.

"Mining is good; all the gold camps are going ahead. Cripple Creek is especially good. They finally found out that the city is on a volcanic crater and that it is all gold, 'paved with gold' literally. They are grinding up the dumps that were waste material and making nice profits per ton in so doing. They have just completed a new mill that has a capacity of 600 tons daily and are talking about another one. They are building a half-million addition to the mint here. I think that silver will 'land on its back' as a baser metal. The building business here is looking fair, especially residence building. If the nation as a whole would

get the labor unions and material men to reach some agreement as to lower costs and if the government would back up the game with cheap money, all our troubles would be solved, as it is the backbone of the nation's business and our salvation. — My family is still intact. I have a grandson in Tulsa studying oil geology at the University and two more to follow soon. My oldest son is with one of the large oil producers in Tulsa. The oil business is good and, like the gold business, just beginning." — Yes, Ladd, all 25 of us who were at Rockport for our "45th" are still alive. Maybe we have got our second wind or maybe only second childhood.

W. G. Besler, railroad mogul and chairman of innumerable boards, agrees with the Secretary that "no further comment is needed to explain why the 30th anniversary of the Boys' Clubs was such a success, than to state that Ned Webster was program chairman." He investigated and found out that the New York Railroad Club had 3,093 guests, compared with 2,300 at the Boys' Clubs dinner back in 1929, served at the Commodore Hotel in New York. Those were the halcyon days compared with the present New Deal days. Besler also states that he is looking forward to the celebration of our 50th anniversary in 1938 — little over two years hence — and recalls the morning 50 years ago this winter when Winslow Blanchard showed up in the classroom "battered and bunged up, the result (as he told it) of being blown into rough ice with a sail which he had fastened to his back and of which he lost control." If any remember this incident, please drop a line to the Secretary.

Prexy Sawyer advises that our versatile classmate, Harry Horn, has recently been appointed a member of the Alumni Council representing the Technology Club of Northern New Jersey. We wonder if he has accepted this appointment so that he can have a good excuse for playing golf with his constituents on some of the many beautiful courses of northern New Jersey.

We have just learned of the death of Raymond Perry Vinton on January 27 at the Baker Memorial, Massachusetts General Hospital, after a short illness. He was the son of the late Rev. Francis Vinton, D.D., and Elizabeth M. Vinton, and was born in Pomfret, Conn., September 13, 1865. He attended Technology from 1884 to 1886 as a special student in architecture with our Class. He afterward worked in several architect's offices in New York, Boston, and elsewhere. From 1930 to 1932 he was with Hiss and Weeks, 18 East Forty-ninth Street, New York City. He made several trips abroad in travel and study. In 1933 he moved to his family home in Pomfret, Conn. He was unmarried and the last survivor of his family. The foregoing information was obtained through the kindness of Joseph P. Loud '87, an intimate friend.

One of the most active members of the Class and especially of the "Society of '88" of which he was secretary during our undergraduate days was George Ulysses

Plan to attend Alumni Day at M.I.T. on June 8, 1936

Grant Holman, who now prefers to be called just plain George Holman. Ulie, as his "kidhood" friends called him, has a very remarkable memory for things that happened and things that were said by his classmates during our four years at Tech. He has given the Secretary quite a little of this special information, but unfortunately for lack of space we can give only one sample item in this issue; if you like it, watch for the next issue when more items of the same kind will be given: "Louis Ferguson was the wit of the Course VI men; he always had a quip ready to lighten our scholastic labors. I recall his saying, when someone voiced the thought of what the Class of 1900 would put out as its windup for a class cheer, 'Oh, they'll say *nothing* twice!'" — BERTRAND R. T. COLLINS, *Secretary*, Chebeague Island, Maine.

1890

A recent columnist speaks of a successful firm of architects, composed exclusively of women, as one of Boston's assets. She states: "The ladies of the firm say that the men who pay the bills and want to please their wives appreciate that feminine touch." This is the firm of Howe, Manning and Almy, and was founded by Lois L. Howe of our Class over 40 years ago. All the members of the firm are graduates of Technology, the other two being Eleanor Manning O'Connor '06 and Mary Almy '20.

The Boston papers of January 14 report the probable retirement of Guy C. Emerson from the office of consulting engineer of the Boston Finance Commission. He became superintendent of streets under Mayor Hibbard in 1908 and took his present position in 1910. The papers report that he has reached the retirement age; evidently the Mayor wants to use his salary for other purposes. Guy worked as rodman for the city during the days when he was going through Technology, but later was employed by the government in Wyoming on construction work. He still looks hale and hearty, and we hope they will give him a big enough pension so that he can enjoy the thrills of life for many years to come.

The Assistant Secretary, on the way back from northern Quebec in February, came through Ottawa and had the pleasure of spending an hour with Ernest LeSueur. Anyone who remembers Ernest at all will remember that terrible grip. I believe he still holds the record at some gym in Ottawa. He looks no stouter than he did in the lean days of '90. He has had an office in Ottawa for many years, from which his consulting work extended into the United States, but he has recently retired from active business. He has one daughter married to the Commandant at Kingston, Ont.

These notes are being dictated from a bed in the Phillips House of the Massachusetts General Hospital where the Assistant Secretary has just parted with his appendix. — GEORGE L. GILMORE, *Secretary*, 57 Hancock Street, Lexington, Mass. GEORGE A. PACKARD, *Assistant Secretary*, 50 Congress Street, Boston, Mass.

1895

Frank Augustus Bourne, architect and author, died on Saturday, February 15, at his home, 130 Mount Vernon Street, Boston, in his 65th year. For years Frank had his offices at 177 State Street, Boston, and was the architect of many churches in Greater Boston and 21 houses in Charles River Square. His place of birth was Bangor, Maine. He was a student at the University of Maine, 1889 to 1891, and he received his B.S. degree from the M.I.T. in 1895 and his M.S. a year later.

He designed the Winchester Congregational Church, Bangor Congregational Church, St. Luke's in Chelsea, St. John's in Franklin, the Mission of the Epiphany in Dorchester, the Church of All Nations, Boston, Our Lady of the Snows, in Dublin, N. H., and Ray Memorial School and Dean Academy Science Building in Franklin, Mass. — Considered an authority on his subject, he wrote many articles and books, among them: "Study of the Orders of Architecture," 1906; "Architectural Drawing" (with H. V. von Holst '96 and F. C. Brown), 1914. He also compiled bibliographies of city planning, 1914, and housing, 1920. He was a member of the Harvard, Union Boat, Exchange, Harvard (New York), and the Arts (Washington) clubs. Mrs. Bourne, the former Gertrude Beals of Boston, whom he married in 1904, survives him, with one son, Philip Walley Bourne of Washington, D. C.

Frank Bourne was an outstanding character in his special profession; it was his custom to travel, both on foot and by auto, over the byways of England and the Continent, making his yearly pilgrimages in the summer, thereby absorbing from the old masters an inspiration which was greatly reflected in many of his monuments of architectural beauty. He served as secretary-treasurer of the Class from March, 1920, to June, 1925. At Plymouth, Mass., on June 14, 1925, he passed his pencil as secretary to your humble Secretary (L. K. Y.).

Would it be too much for your Secretary to ask all '95 men reading these columns to drop a few lines and tell him what you are doing and what your outlook is for the future? It will be helpful and cheering and will be much appreciated by every one of us. — LUTHER K. YODER, *Secretary*, 69 Pleasant Street, Ayer, Mass. JOHN H. GARDINER, *Assistant Secretary*, Graybar Electric Company, 420 Lexington Avenue, New York, N. Y.

1896

Last month a list was given of classmates who had replied that they expected to come to the class reunion at Osterville, June 4 to 7, inclusive, and in order to save you the time of looking back this list is repeated as follows: Mark Allen, Billy Anderson, Admiral Bakenhus, Dan Bates, Billy Clifford, Dr. Coolidge, Bob Davis, Joe Driscoll, M. L. Fuller, Henry Grush, Henry Hedge, Will Hedge, Frank Hersey, George Hewins, Clark Holbrook, Gene Hultman, Charlie Lawrence, Gene Laws, Marsh Leighton,

C. E. Locke, Ed Northup, Karl Pauly, Walter Pennell, Myron Pierce, Johnny Rockwell, LeBaron Russell, Walter Stearns, Mike Sturm, Bert Thompson, Perl Underhill, Lloyd Wayne.

The replies are still coming in and the following men should be added to the foregoing list of those hoping to come: Arthur Baldwin, Dave Beaman, Eddie Bragg, Joe Clary, C. I. Crocker, Buster Crosby, Harry Fisk, Johnny Hallaran, Sam Hunt, Henry Jackson, Elbridge Jacobs, Walter Leland, Paul Litchfield, Charlie Moat, Harold Peckham, Bradley Stoughton, Lucius Tyler. This makes a total of 48, and there are still some of the old stand-bys yet to be heard from and others who may feel the urge to come to the reunion.

If you, as an individual, plan to come and do not find in the foregoing list some old pal whom you would like to see at the reunion, please make it your business to write to that pal direct and let him know how much we would all like to see him.

Arthur Baldwin writes that he feels certain he can revamp his schedule so that he can make his American trip this year at the time we have our reunion. Incidentally, Arthur enclosed a clipping from the European edition of the New York Herald Tribune which contained an editorial congratulating the American Chamber of Commerce of France on heading its ticket of officers for the current year with Arthur Baldwin as president. Arthur had accepted this nomination, which would mean a third term in the office, with some reluctance, and only after unanimous pressure from the nominating committee. Arthur is performing a real public service and is entitled to much credit for the high standing of the organization and its accomplishments in the last two or three years.

Charles Batchelder would like to be with us, but excitement brings on severe headaches from which he has suffered for years. Eddie Bragg's acceptance is with the proviso that his classes run up to June 6, so he will have to cross the country in rapid time, and probably will miss much of the reunion. You should note especially that Joe Clary has signed up definitely, although he makes the limiting phrase "for part of the time anyway." Calvin Crocker is another individual who has never come to a reunion. His reply was sent from Florida where, like Con Young and others, he seems to be having a good time, presumably in retirement. He expressed himself as hoping very much that he could be with us. Buster Crosby is again in line for the reward to the classmate coming the longest distance. Henry Disston has pleaded poor health as the reason for his inability to attend. Andrew Green sent his reply from the University Club of Chicago, where he was apparently spending a little time this winter, but he reported that he was sailing for home in Dominica in February, and that he did not feel that he could make another trip up here in June for our reunion. Johnny Hallaran, who missed our 35th reunion, has apparently regretted it ever since, and gave positive assurance that he would

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be with us. At the time he wrote he was about to sail on Friday, February 7, from New York, on the S.S. *Georgic* for an 18-day cruise to include St. Thomas, Martinique, Barbados, Trinidad, La Guaira, Curaçao, Cartagena, Panama Canal, Jamaica, and Havana. Jacobs has completed his story of the trip around the world and it will appear in these columns when space allows. His baby at the present time is the Robert Hull Fleming Museum at the University of Vermont, where he is continually installing new exhibits and this, with his seismograph, keeps him busy. Walter Leland in San Francisco has been counting for years on attending this 40th anniversary, and he still hopes that he may get here, although unfortunately (?) his business has been improving and a big job in the office makes it look as if he might have to stay home.

There is no word yet from Charlie Hyde in far-off California. Let us hope that the Goodyear strike, which is on at the time these notes are being written, will be settled so as not to keep Paul Litchfield away from us in June. With Herbert Newell it is distance rather than time which keeps him away. He has plenty of the latter on his hands, but from Portland, Ore., to Boston is a long trek. Harold Peckham almost got to us five years ago, and he is going to try his darndest this year. Bradley Stoughton was seen by the Secretary in New York in February at the annual meeting of the American Institute of Mechanical Engineers, and at that time Bradley said that he would be with us, even though he had to close Lehigh University a few days early to do it. Howard E. Smith of Rochester, N. Y., who replied in the negative, did not give any reason. Henry Waterman apparently enjoyed his initial experience so much five years ago that he is eager to repeat. Freddie Walker in Philadelphia in the past few years has had to contend with bank failures, illness of himself and family, and change of job. At the time he wrote he was with the Avon Company of Philadelphia, agents for the Corozone Company of Cleveland, handling all kinds of air conditioning. A dislocated shoulder had laid him up for two months. He did not see how he could possibly be with us. Lucius Tyler says he has been in communication with Charlie Hapgood, and Charlie cannot tell at the moment whether he could get away to our reunion. He usually goes abroad every year in the early part of June, but there seems to be some chance. Joe Pillsbury, who is commissioner of the Workmen's Compensation Board in Vancouver, B. C., recently reported that he planned to visit the United States Navy Yard at Bremerton on an inspection trip. Further report from W. T. Dorrance on the item last month of classmates meeting in New York explains that this occurred at the annual convention of the American Society of Civil Engineers. Dorrance says that he has been in touch with Jameson in Washington, but no reply has been received here at headquarters as yet from Jameson. Incidentally, Clar-

ence Perley has not come through with any direct commitment, but we are still assuming that his daughter is a truthful person and her statement that her father will be with us is dependable. Marsh Leighton, who has undertaken to bring on a Washington contingent, has not made any further report of who will be in his gang. Irv Merrell is going to stay in Florida this summer and keep on the straight and narrow path so essential to his health. He finds that St. Petersburg is a good place to live when one is retired, and the retired people make up 75% of the population, so that one has plenty of company, and does not feel at all out of place. He will be with us in spirit in June, and asked that greetings be extended to all of his old friends.

Billy Anderson had a letter from Stanley Howland. Stanley had reported that he would not be able to come to the reunion and Billy wrote to him. Stanley cannot see the faintest hope of getting North. He did get away last summer for three or four months for a trip to Europe with his sister, but he is suffering, like many other people in the South, from a case of what might be called congested real estate. He would like to see the old crowd. The only connection he had had of late was the occasional jar of Mark Allen's shaving preparation which he had occasion to buy. Two of his daughters are married, one living in New York and the other in Asheville, and his son is in his third year at the Naval Academy at Annapolis. One of his brothers lives near Asheville and another has been wandering over Europe for the last seven or eight years; neither of them is married.

Louis Marble, who is located in Cleveland, Ohio, has recently done a splendid job of sleuthing which has resulted in the relocation of George S. Bowes, who has been missing for a considerable period. Marble finds that Bowes left Newcomers-town, Ohio, about ten years ago, and he is now living with his sister at 421 Locust Avenue, Zanesville, Ohio. No regular occupation is reported, which may mean that Bowes is unemployed, or that he has permanently retired.

Myron Fuller wrote from Avon Park in Florida during February reporting that he and Mrs. Fuller were spending the winter this year on the East Coast. He had been at Boca Raton a few weeks previously, but had not run across von Holst. He expected later to go from the West Coast up through Pensacola on the way to Gulfport and Biloxi, Miss. He and Mrs. Fuller find their place in Easton, Mass., too cold for the winter, and their Florida stay was expected to continue until about the first of May.

The Secretary recently received a letter from Arthur T. Hopkins '97, who made mention of his visits to the Tucker apple ranch in North Andover which Tucker has been developing for 15 years, more or less, and which is now in the self-supporting stage, and also of his visit to Gene Laws. He went somewhat into detail on the work that Laws has done in taking hold of an abandoned farm near Fitchburg and turning it into a modest

profit-making poultry farm. This report was nearly a year old, but at that time Laws had sold 50 turkeys before Thanksgiving and had a good breeding crop left for the coming year. He also had 567 laying hens and was specializing somewhat in Rhode Island Red eggs for hatching. Incidentally he had been doing quite a bit in the garden, and had had fair field crops, but he had to be careful not to expand too much into general farming and undertake more than he and Mrs. Laws could handle. The Secretary has written Laws for a more recent report which will bring his results up to date. It may be that in these times of AAA relief we will all have to turn farmers, and Laws' experiences may be of incalculable value to members of the Class of '96.

Lloyd Wayne in Indianapolis sends word that he is trying to induce Joe Stickney to come to the reunion. Joe has promised us that he would come sometime, but has never made good on his promise, always having the alibi that he was too busy or that something else interfered. Let up hope that Wayne may be successful in his efforts this year, and the Secretary suggests that if any other classmate has any way of offering inducements to Joe, he proceed to Wayne's assistance immediately, because it is reported that Joe's hair has largely departed from the top of his head, and we would all like to have an opportunity to verify this personally.

Con Young has written one of his characteristic newsy letters from Florida, from which the Secretary can give you only the high spots. He and Mrs. Young had taken a trip, Thanksgiving Day, across the State, and they saw much of the farming and market-gardening operations. The trip included Palm Beach, and also Boca Raton, where they located von Holtz, who is in command of a lovely subdivision, a quarter of a mile west of the highway (Route 1), which he calls Floresta. There are 16 attractive Spanish-type cottages and bungalows. The Youngs then went on to Miami Beach and got back to Fort Myers in the early evening. Con had kept quiet after arriving at Fort Myers as his muscles were sore and there was some neuritis disturbance, but apparently these were things of the past, and he and Mrs. Young were in good health. Incidentally he reported receiving a letter from Joe Clary, who was celebrating his first anniversary with a party made up of father and daughter, mother and son, also stepfather, stepmother, stepdaughter, and stepson. Nevertheless this made only four people total, because of the unique circumstances whereby Clary, a year or so ago, married a lady whose son was marrying Clary's daughter.

We can always count on an interesting letter from Victor Shaw in Alaska. Recently the Secretary wrote him, telling him it was time for him to come through, and the following is his characteristic reply: "You are quite right: I might kick in with class news which would be of interest from up here. Mrs. Shaw's health was rather seriously affected early in 1935,

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and I had to ship her out to the States, to her old home in Iowa. She is now in San Berdoo with friends, has improved a lot, and is waiting for me to join her, which I may do later this spring, as she cannot live up here any more.

"I am still acting as mining editor of *Adventure*, a department I've conducted since 1920, and which I suggested to Arthur Hoffman. It has proved one of the best in this magazine. I am also functioning as mining editor of our *Alaska Sportsman*, the only magazine published in Alaska, but is, in my opinion, on a par already with any other outdoor magazine of this type in the field. It pays me little, but I'm still doing what I can to boost Alaska's rich resources, especially its gold and platinum possibilities. As a matter of fact, rough topography, with moss and brush and down-timber tangles as a barrier to surface travel in summer, has held Alaskan mining back greatly, so far as new finds in new fields are concerned. In late years the plane with pontoons to land on the many interior lakes and streams has surmounted this obstacle. To the natural barriers also has been added faulty mining law, bureaucratic control, and even political disenfranchisement, since even our one delegate to Congress has no vote and can only 'shoot off his face.'

"Despite these last drawbacks, aided by \$35 gold, the Territory is on the verge of the greatest mining expansion in its entire history. New gold discoveries are being made each year, both of placer and quartz gold. New mines are coming into production and old mines are being revived. (Even the old sea-flooded Treadwell is to be investigated at a cost of a million by Bradley of our Alaska-Juneau mine, and if findings seem adequate, big capital will take over the work.) Since our annual exports of gold are increasing by millions, Alaskan mining is on the up and up decidedly. B. D. Stewart, our mines commissioner, says that our chief drawback now is scarcity of competent prospectors. Rex Beach, who never mined, is just repeating what mine operators here told him last summer. To my mind his scheme for supplying this need is obviously impracticable. Government control has always been a failure. Alaska has always suffered from it, and so has the country for the past four years.

"My idea is that results will come only from individual efforts of qualified men attracted here by the fact that Alaska now offers about the only favorable prospecting area in Uncle Sammy's possessions, our western mineralized fields being practically barren of surface deposits for small-scale hand working. That is worked out to a great extent all over, leaving only deep stuff to be found by geophysical methods and developed on tonnage basis by dredge, and so on, all of much value being very low-grade gravels. Of all this you probably are aware, except perhaps the big fact that Alaska's crying need today is more prospectors. I've been doing what I can for the past 12 years of residence to supply this need, and am still

hammering away at the proper type of publicity in the limited means at my disposal. I reach thousands who have the urge, but many have not the grubstake necessary to maintain them here. This is the chief reason why I accepted appointment as mining editor of the *Sportsman* this spring. Really I can ill afford the time and thought required for monthly contributions from the writing I must do to make my living. However, I am trying it out to test response.

"I have not even been able to get about enough to function as Alaska correspondent for the *Engineering and Mining Journal*, though appointed some years ago. I have submitted articles and items from time to time, but have been tied too closely to this address to operate properly, as you know. If I can make certain plans go through this spring, I'll cover the entire Alaskan mining field personally each summer, and I sure can make that news section of the *Engineering and Mining Journal* one of its best, as there is a world of material of great importance and intense interest to mining men. Just the history to date of Carl Witham's rich Nabesna gold mine over on the upper Tanana River is an eye opener, besides being a fine example of a sourdough working on a shoe string to develop a high-grade property into production. He flew in all machinery and material for his mill and surface improvements, flew out his sacked high-grade in ton lots at first, but now has built an auto road that last summer had four trucks working daily to the port of Valdez — ore out, supplies in.

"I am now planning an attack of colorful fact articles on this for the better weeklies, if I can land them, to be illustrated with bully photos of operating mills, monitors at hydraulic operations, and so on. The field is wide open, if I can get my oar in — in time. I am so full of all this myself that I am apt to use too much space and time in even an ordinary letter. However, I know you are interested and will appreciate both this bit of fresh news and also what I am trying to accomplish here. I've hit the Seattle news sheet this spring *hard*, submitting three to four articles with photos. They see my stuff is timely and tell me it is exceptionally well handled, but they say their budget does not admit taking on this feature stuff just now. Heck! It'd increase their blamed circulation if they did what I suggest — run a daily series on Alaskan mining and prospecting needs and facts. I know from *Aski Adventure* letters covering two decades that the Northwest and the state of Washington are full of prospectors who want only competent data on where to get busy. Oh, well!

"I am sure glad to get your tiny personal addition to the anniversary announcement, and would enjoy a good smoke talk with you on everything in general." Shaw expresses himself strongly and in his typical manner on the situation in the United States and many of the movements in Washington, viewed, as he expresses it, by one who is sitting way up North on the national bleachers watching the game. He closes with best wishes to

all for a fine class reunion and is sorry that he cannot be with us in person. — CHARLES E. LOCKE, *Secretary*, Room 8-109, M.I.T., Cambridge, Mass. JOHN A. ROCKWELL, *Assistant Secretary*, 24 Garden Street, Cambridge, Mass.

1898

Hollis Godfrey was a man of boundless energy and many activities. Like many others who were not primarily Technology men, he came to the Institute for special courses and, although he did not enter into our undergraduate class activities nor even get acquainted with many of our Class, he was, nevertheless, later classified as an Alumnus of '98. He immediately began to attend regularly all of our class dinners and reunions and at once endeared himself to us through his enthusiasm and geniality. He soon took a leading part in our class councils — indeed, in the general Alumni Councils. Our Class has always felt highly honored that, of all the affiliations he might have chosen, he gave so freely of his friendship and enthusiasm to '98. We insert selections of a biographical sketch from the *Boston Transcript*: "Dr. Hollis Godfrey, consulting engineer, author, and educator, died at his Cedar Street home in Duxbury. Dr. Godfrey, who had been in ill health for some time, was 61 years old. — A graduate of Tufts College, Dr. Godfrey, who wrote extensively on scientific subjects for the *Boston Transcript* in the first decade of this century, became nationally known as an author in 1908 with the publication of his 'The Man Who Ended War.'

"Called 'one of the most daring and at the same time most entertaining works of recent fiction' by reviewers of the day, this book gave him a reputation as a writer who combined imagination with a great knowledge of science. His ingenuity in conceiving the mechanical devices of future wars, displayed in the book six years before the beginning of the World War, led to his working with Elihu Root, General Leonard Wood, and Howard Coffin in creating the Council of National Defence of the United States. From 1916 to 1918, he served as Federal commissioner for the advisory committee of the Council and was in charge of its section of engineering and education.

"As president of the Engineering Economics Foundation in 1931 he appeared for the last time before the public eye when he won a \$4,800 suit against J. R. Whipple Company for injuries received when an elevator in which he was riding with former Mayor Malcolm E. Nichols dropped two flights to the pit.

"Dr. Godfrey was born in Lynn in 1874, a son of Andrew and Anna S. Godfrey. He received a degree from Tufts College in 1895. He studied at Harvard in 1896, at M.I.T. in 1898, again at Harvard in 1905 and 1906, and later at Miami University and at Queen's University and Bishop's College in England. He held doctorates in law and science.

"From 1906 to 1910 he was head of the department of science in the School of Practical Arts in Boston and was con-

1898 Continued

sulting engineer of the Iowa Survey during the research into health conditions of Philadelphia and Atlantic City between 1910 and 1917. Dr. Godfrey was appointed, in 1913, president of the Drexel Institute of Art, Science and Industry in Philadelphia, a school nationally known for its training of young men and women for practical business life.

"As a writer he was a frequent contributor to the *Atlantic Monthly*, *Collier's*, *Review of Reviews*, *Youth's Companion*, and to engineering and scientific journals. He specialized in the field of engineering economics, with special reference to public health, yet found time in his active life for the publication of "The Norton Name," 1908; "Elementary Chemistry," 1909; "The Health of the City," 1910; "Juveniles," 1911 to 1912; and "Creating Wealth," 1927.

"He was a member of the following clubs: Art, Philadelphia; Harvard and City, Boston; Chevy Chase, Cosmos, and University, Washington. Dr. Godfrey was a vice-president of the Alumni Committee of M.I.T., former president of the Associated Tufts Clubs and former president of Phi Beta Kappa Alumni, of which he was a senator from 1914 to 1920. He was a trustee of the Drexel Institute, a fellow of the Royal Geographic Society, and member of the American Association for the Advancement of Science and the American Society of Civil Engineers. — He leaves his wife, the former Mary Lawrence, whom he married in Boston in 1895."

Dr. Clara E. Gary was another distinguished member of our Class whose undergraduate connection was similar to that of Hollis Godfrey. Although her graduate affiliations were not so close, she was known to a number of us as a charming lady and a distinguished physician. We quote from the *Boston Herald*: "Dr. Gary died Saturday [February 17] following a year of failing health. She was the first Vermont woman to enter the medical profession, and the honorary degree of doctor of science had been conferred upon her by the University of Vermont.

"She was born in Middlesex, Vt., the daughter of Ephraim and Sarah (Robinson) Gary. When she was five, her family moved to Montpelier, where she was graduated from the high school and entered Montpelier Seminary. From there she went to the Boston University Medical School, where she received her degree in 1885. Dr. Gary's first service was at the Boston Homeopathic Hospital, followed by her appointment as house surgeon at the Boothby Hospital.

"Dr. Gary was a pioneer in electrotherapy and took special courses at the M.I.T. in connection with the subject. To complete her study of electrotherapeutics she went to Europe, where she studied and visited hospitals as an observer in Vienna and London. Since 1900 her office and home had been at 416 Marlborough Street, where she specialized in physiotherapy and the treatment of nervous diseases. During the World War Dr. Gary gave free medical aid to families

of men in service, was a member of the war service committee of the Massachusetts Daughters of the American Revolution, and was New England chairman of the Women's Homeopathic Base Hospital Unit. She was a member of the Volunteer Medical Service Corps, an ex-vice-president of the American Institute of Homeopathy, and one of the organizers of the institute fraternity. She held various offices in the National Society of Physical Therapeutics and the Massachusetts Surgical and Gynecological Society, and was a member of the Massachusetts Homeopathic and Boston Homeopathic Hospital Medical societies and of the Alumni Association of Boston University Medical School.

"Dr. Gary was a member of the Daughters of Vermont and of the National Society Daughters of the American Revolution, honorary member and ex-regent of Old Boston Chapter, D.A.R., and a member of various other organizations."

We have also the sad duty of reporting the death of three classmates who were well known to us as undergraduates: Susannah Usher, VII, died, August 31; Durand Churchill, VI, died, September 11, in Oakland, Calif.; Leslie C. Allen, VI, died, November 22, in Newport, R. I.

The following clipping from the *Pasadena Star* should interest us: "A hearty seafarer is Captain Paul Franklin Johnson of Altadena, newly elected commodore of the Balboa Yacht Club, but seafaring is only one of several hobbies he follows with pleasurable interest. As master of the good power yacht, *Seyelyn II*, Commodore Johnson sails up and down the coast as easy as you please; but in port the commodore may turn business man in the twinkling of an eye by putting in at one of the branch offices of the Johnson Service Company, headquarters, Milwaukee, Wis., and doing some work. The company was founded by Commodore Johnson's father, Professor Warren S. Johnson. The commodore himself is treasurer and one of the largest stockholders of the corporation which manufactures devices and equipment for temperature regulation and control. The company, started in 1883, was doing this long before the modern phrasing, 'air-conditioned,' was thought of, and has been very successful. An early day employee of the elder Johnson was a young man named Lee DeForest, who later had a lot to do with the development of radio by inventing the audion tube for broadcasting.

"The elder Johnson and the Commodore himself were early interested in radio experiments, and Commodore Johnson is interested in them to this day. When ashore he has, for years, carried on radio experiments at his beautiful home at 3100 Maiden Lane, Altadena. More as the furtherance of a hobby and the promotion of interest in radio, rather than as a business venture, Commodore Johnson owned and operated one of the earlier radio stores here. His interest in radio he transmitted to his son, Seymour

Johnson, one of the leading radio engineers. For KFI and NBC he had charge of the Rose Tournament parade and football broadcasts.

"Another hobby of Commodore Johnson is amateur photography. He has been Kodaking as he goes ever since 1896. He is carrying on interesting experiments in color photography, both with still pictures and movies. He doesn't think any of the experimenters in color photography have quite hit it off yet, but thinks they will in time.

"Reverting to Commodore Johnson, the sailor, his latest cruise was from Seattle to Los Angeles harbor in seven days, with two days stay in San Francisco *en route*, considered topping time for a power yacht. Being commodore of the Balboa Yacht Club is a high honor among yachtsmen, for the Balboa crowd are real sailors. Yachtsmen are complimenting the Balboans on their choice.

Charley Hurter dropped in on us at Christmas time. He was on a visit to his sister in Newton Highlands. He planned to start on a South American cruise, February 11. — We have a recent letter from Frank Coombs who says business in his line — building materials, particularly terra cotta — is improving. Commenting on our present winter in the East he says he is glad he is in "Sunny California" but he says that he expects to see us at our 40th reunion in 1938.

Speaking of class reunions, do not forget that under our new plan, Alumni Day comes every year — this year, on June 8. It is to combine an encouraging send off to the graduating class with a happy reunion of all the old classes. A wonderful program for the day is already mapped out, and separate entertainment is also being arranged for the wives. June 8. Let us make '98's attendance notable. — ARTHUR A. BLANCHARD, Secretary, Room 4-160, M.I.T., Cambridge, Mass.

1900

Notice has just been received of the death of T. Frederick E. Reardon, VI, of Brooklyn, N. Y., on February 15. For a number of years he was connected with the Underwriters Laboratories of Bridgeport, Conn.

Hal Jouett of Cleveland writes that he is still on the job with the Terminals Company and sends regards to all. — A clipping from the *Electrical World*, December 21, states that Frank D. Chase, a member and past President of the Western Society of Engineers, has been elected chairman of the Washington Award Commission for the year 1935 to 1936. This commission annually presents the Washington Award, established in 1916 by past President Alvord of the Western Society of Engineers, "to an engineer whose work in some special instance or whose services in general have been noteworthy for their merit in promoting the public good." — C. BURTON CORNING, Secretary, 111 Devonshire Street, Boston, Mass.

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1901

It is now Washington's Birthday, as I write these notes; it will be April when you read them; before you know it our 35th reunion, June 6 and 7, at Oyster Harbors will be here! Be making your arrangements to attend at once, if you have not already done so.

Frederick G. Clapp spent several weeks this last winter in California and other parts of the Pacific Coast making inspections of producing and prospective oil areas. In an article which he wrote for *The Oil Weekly* on "The Past Year in Foreign Developments" he says: "No sensational discoveries are recorded as taking place in foreign oil fields during the past year. If petroleum often made daily headlines, the news almost as frequently turned out to be reporters' nightmares or overambitious schemes of kings and dictators. The widely mooted Ethiopian oil fiasco, for instance, was based on queer views of international politics and was more of an individual than a corporate venture — not based on the proven existence of an area even regionally favorable for oil. It has yet to be demonstrated that Ethiopia holds more than a remote prospect of ever yielding petroleum."

E. F. Church, Jr., head of the department of mechanical engineering of the Polytechnic Institute of Brooklyn, informs me that Carl Rossmassler died, December 28. He writes: "Carl and I were closely associated for 15 years and his death has been a great shock to me. He is the last of a group of XIII men with whom I kept in close contact after leaving college. . . ." He also promises to send me a brief biography of Rossmassler which he has written for our class records.

Albert F. Sulzer, Vice-President of the Eastman Kodak Company in charge of the Kodak Park plant at Rochester, N. Y., was elected assistant general manager of the company at a meeting of the board of directors last January.

W. Cornell Appleton sends me the following news regarding himself: "Still practicing architecture despite the depression. We have a record of continuous service to the clients since 1870 when the office was opened under the name Peabody and Stearns. I joined the office on being graduated in 1901, was admitted to partnership in 1914, and changed the name to Appleton and Stearns in 1919. We have occupied the same quarters since 1890, the date of completion of the Exchange Building in Boston, for which we were architects. We are old in experience but youthful in spirit and enthusiasm."

William E. Farnham is traffic facilities engineer for the American Telegraph and Telephone Company, which means the development of methods for determining the amount and the arrangement of the facilities used in handling local and toll telephone calls. He has completed 34 years with the Bell System, the last 25 with the headquarters organization in New York.

Donald A. Kohr, President of the Lowe Brothers Company of Dayton, Ohio, in filling out his class questionnaire says he has not seen an '01 man for 15 years or more. I think it is time that he did and that Oyster Harbors, June 6 and 7, will be a good place to make their acquaintance! — ROBERT L. WILLIAMS, *Secretary*, 109 Waban Hill Road North, Chestnut Hill, Mass.

1905

The mid-winter get-together at Walker Memorial on February 17 proved to be another success in regard to both quality and enthusiasm. Present were Buff, Cowdrey, Dissel, Donald, Fisher, Hadley, Insurance Johnson, Marcy, Keith, McLean, Pirie, Prescott, Tower, Young, and Goldthwait. Sid Strickland broke away from his client just in time to say farewell to the late leavers. Several of the faithful who yearned to be with us were prevented by good and sufficient reasons. Bill Ball, our floating Secretary, who previously had signified his intentions of showing his famous bowling form, found himself 200 miles north of Quebec on the Sunday before. Harry Wentworth was busy packing his golf clubs, prior to leaving the next day for a month's tour in Florida, Cuba, Alabama, and so on. Hub Kenway, apparently from a too diligent practicing for his next tennis game with Hadley, was laid up with a very painful attack of bursitis in his shoulder. Arthur Abbott was likewise prevented from attending by a severe case of arthritis, which has kept him pretty much under cover since last fall. Charlie Boggs was *en route* for the sunny South to escape New England winter weather for a month. Roy Lovejoy wrote rather facetiously and tantalizingly from his New Orleans factory that he was enjoying summer weather and preparing for Mardi Gras. It's great to have a summer and a winter factory, and we note Roy happens to be in old New England when we have "real weather."

Apparently Monday is a busy night for many of the fellows, as regrets came from Barrier, Perkins, Fred Abbott, Carlton Atwood, Langworthy, Kriegsmann, Gilman, Cronkhite, Crowell, and Thomas, who promised to be on hand at the next. Wiggins, back from his boat trip to the Pacific Coast in renewed health, intended to drive up from Providence with Dickerman, but apparently the worst storm of the season prevented. At a business meeting, the Secretary was instructed to convey to Mrs. Charles W. Hawkes the sympathy of the Class at Charlie's untimely death. After enjoying one of Chef Bridges' excellent dinners the group descended to the bowling alleys where greater proficiency in finding the gutter than hitting the candles was exhibited. McLean's Mammoths (Goldy, McLean, Fisher, Tower, and Keith) beat Pirie's Pee Wees (Marcy, Buff, Pirie, Donald, and Hadley) with a score of 903 to 876.

The score is printed at the risk of libel and in that regard mention might be made that Prescott "pinched" for the Pee Wees, but his score being added to the

loser's total, it was found of infinitesimal value. The management has agreed to fill up the gutters for Al next time.

During the evening the question of an "off year" reunion in June was considered informally. Another get-together early in April will more definitely consider this question, and it will help if all those reading this will consider it a request to write your Secretary your feelings and desires in this matter. Many fellows want a June get-together just prior to Alumni Day. Do you?

Other news items are scarce, due to the failure of distant members to dig up news or write of themselves. We learn that Luther Gilmore, X, has moved to Florida; address, Box 1054, Delray Beach. We hear indirectly that his health has been seriously undermined. Hope you find Ponce de Leon's fountain of youth, Luther. Ben Lindsly, III, has returned to temporary service with the Petroleum Administration at Washington; address, 1729 New York Avenue. Jack Flynn, II, has transferred from Rio de Janeiro, Brazil, to Buenos Ayres, Argentina, still in the service of the Armco International Corporation, however.

Charlie Starr, I, previously Chicago, now is 3900 Connecticut Avenue, Washington, D. C. C. Robert Adams, I, is now at 62 Farragut Avenue, Piedmont, Calif. Henry H. Russell, VI, is in the service of the Standard Oil Company, at Calcutta, India. E. F. Kriegsmann, I, has extended his operations to Hartford, Conn., still in PWA engineering work. Gene says that projects of \$650,000,000 for water supply, sewage disposal, and bridge work have been completed in Connecticut and Rhode Island through his department.

Enough letters, clippings, and reports concerning Harry Charlesworth and Doc Lewis and their increasing honors, directorships, and so on, have reached the Secretary to fill these columns monthly. If we say "ditto," classmates will know it means a continuance of the recognition of the good works of our most publicized classmates. More power to them.

The "Register of Former Students" wishes a new address for and information regarding William H. Lalley, formerly with the Kelly Springfield Company. Can anyone furnish that? We learn through the same source that Harry R. Vonder Horst, III, died on September 6, 1914.

Sid Strickland, IV, apparently resented Mackie's boasting about grandchildren in our last issue, for he has just reported the birth of another grandchild, his second. Next? — FRED W. GOLDTHWAIT, *Secretary*, 175 High Street, Boston, Mass. SIDNEY T. STRICKLAND, *Assistant Secretary*, 209 Washington Street, Boston, Mass.

1906

With further reference to our Thirtieth Reunion: By the time you read these notes the event will be about two months away. At this writing (February 20) we are able to announce definite plans as follows: The reunion will be held at the Oyster Harbors Club, Osterville, Mass., June 6

1906 Continued

and 7. As has been our custom in past reunions, wives and families of classmates will be welcome to attend. The dates selected are the Saturday and Sunday previous to the Alumni Day on Monday, June 8. Classmates may arrive at any time previous to June 6 and it is probable that those in the Boston vicinity will plan to be on hand Friday night, June 5. The majority will probably leave Oyster Harbors on Monday, the 8th, in order to go to Cambridge to enjoy the Alumni Day festivities. Readers will be interested to know that the Class of 1901 is holding its Thirty-fifth Reunion at Oyster Harbors on the same dates. This apparent conflict has been considered by the secretaries of the two classes and it was concluded that the presence of both groups would add to the success of the occasion. Those who attended our 25th reunion at Oyster Harbors will undoubtedly be pleased to hear that we are returning to the same location. It has all the attractive features necessary for a class reunion and it proved so enjoyable five years ago it was thought we could do no better than to plan this reunion at the same place. By this time you should have received a notice giving more information about the reunion and, if you have not already done so, please return the data sheet which accompanied the notice to assist in the definite arrangements.

Classmates will be sorry to learn of the death of Wallace R. Hall who died in Calcutta, India, on December 18. Hall was a graduate of Course I and spent some time in this country on building-construction work, participating in the construction of the Boston Opera House and of the Municipal Building in the city of New York. From 1913 to 1917 he was located in Turkey and Greece as a representative for the Standard Oil Company of New York. From these countries he was transferred to India where he became their chief engineer, which position he held at the time of his death. Death was due to an embolism following four days after an operation. The Secretary is indebted to Wallace's sister, Ethel L. Hall of Newton Highlands, Mass., for this information. A note was sent to her expressing the sympathy of the Class. — JAMES W. KIDDER, *Secretary*, Room 801, 50 Oliver Street, Boston, Mass. EDWARD B. ROWE, *Assistant Secretary*, 11 Cushing Road, Wellesley Hills, Mass.

1907

Again, classmates, we are nearly entirely lacking in material for our notes. We offer no alibis, no excuses; neither do we make any pleadings or any teasings or any scoldings.

A brief message from Stuart Godfrey states that he is department engineer, with charge of fortifications, military roads, maps, and so on, located at Corozal, Canal Zone, Panama. Stuart is lieutenant colonel in the United States Army. His son, Bob, graduates from Exeter Academy next June and may enter Technology in the fall. — John Barry, consulting mining geologist and engineer of El Paso, Texas, made an extensive exami-

nation trip to Sonora and Sinoloa, Mexico, during the winter. — BRYANT NICHOLS, *Secretary*, 126 Charles Street, Auburndale, Mass. HAROLD S. WONSON, *Assistant Secretary*, Commonwealth Shoe and Leather Company, Whitman, Mass.

1909

It was reported in the New York *Herald Tribune* of January 17 that Thomas C. Desmond, senator of the 27th District, introduced in the New York State Senate a county government bill to carry out the provisions of the recently ratified County Home Rule Amendments: "This comprehensive bill makes possible the modernization of county and township government in all of our 57 counties outside of New York City. No changes of importance have been made in the forms of such governments hitherto for more than 150 years." Printed copies of the bill are available: Address Tom at the Senate Chamber, The Capitol, Albany, N. Y.

Barbara Phillips Lord, daughter of Mr. and Mrs. Paul B. Lord, was married to John Owen Clarke on February 5, at Loretto College, El Paso, Texas. — Ray Temple writes that his son, Allan, was graduated from Amherst College last June, and that his daughter, Jean, is a sophomore at Mount Holyoke College. — Bert Thornley's boy, Albert, Jr., was graduated from Rhode Island State College last June and is now associated with his father at the Narragansett Machine Works in Pawtucket. Bert's daughter, Ann, is attending the School of Design at Providence. Bert is secretary of the Tennis Racquet Manufacturers and was one of the speakers at a meeting of the National Sporting Goods Association held recently in Cleveland, Ohio. — CHARLES R. MAIN, *Secretary*, 201 Devonshire Street, Boston, Mass. *Assistant Secretaries*: PAUL M. WISWALL, MAURICE R. SCHARFF, New York; GEORGE E. WALLIS, Chicago.

1910

Charlie Greene dropped in on the Secretary recently and mentioned that he had met H. N. Crichton at the Cape Cod Canal. It seems that Crichton has been on this job for some time and he was working there within 11 miles of the place where the Class held its reunion last June, but knew nothing about it. Evidently Crichton had not sent in his change of address and notices had gone astray. He was extremely sorry that he missed the reunion, and I am sure that those classmates who were present are also sorry that he missed it.

Abbott Allen has formed the Abbott Allen Company with shops in Lowell where waste-heat reclaimers are manufactured. He also does considerable consulting work on power for industrial concerns. — We have received the following changes of address: Walter T. Spalding, 22 Elm Lane, Bronxville, N. Y. (where he has moved since his return from Washington); Edward O. Scriven, Bell Telephone Laboratories, Inc., 463 West Street, New York, N. Y.; Captain Allan J. Chantry, Jr., Naval War

College, Newport, R. I. — HERBERT S. CLEVERDON, *Secretary*, 46 Cornhill, Boston, Mass.

1911

Today is George Washington's birthday so I cannot tell a lie: Roger Loud says that the forthcoming Silver Anniversary Reunion, scheduled for the Mayflower Hotel, Plymouth (Manomet Point), Mass., June 5, 6, and 7, promises to be the biggest and best yet; I believe him. His efficient committee is working diligently and is leaving no stone unturned to line up a big attendance. Add to reunion probabilities: Royal Barton, Lester Cushman, Cal Eldred, Stan Hartshorn, Charlie Linehan, C. S. Robinson, and Hal Robinson. The list is growing and still we haven't asked for definite commitments.

We had a nice call here at Hotel Bancroft from Stan and Julia Hartshorn from Gardner, earlier this month, and they are looking forward eagerly to the reunion. Unfortunately I missed a call from Joe Harrington, VI, on the last day of January, that being in the midst of my intestinal grippe episode from which I happily recovered in better health and more rested than for a long time, thanks to the fine care of Friend Wife. Joe and Rose are now living at 52 Sprute Street, Scarsdale, N. Y., and he is with the Standard Alcohol Company, 2 Park Avenue, New York City.

Royal Barton, VI, wrote from his office at 2 Rector Street, New York City, and after registering a complaint that the reunion location favored the Boston gang, revealed a happy event in his life. "Sorry the reunion is to be held at Plymouth. It is very convenient for the Boston crowd to motor down there in an hour so so, but for the 40 or more '11 men around New York it means practically an all-day trip. Why not split the distance once in a while and come to Connecticut? — The last time I wrote you I was in Florida and I left Miami Beach on the last day of August — just before the hurricane struck on the keys south of Miami.

"Last spring one of my old friends, whom I had met 10 years before, introduced me to the daughter of one of his good friends, 'a charming lady whom I am sure you will be glad to know.' He was right! On August 31 I married Jessie E. Orr of Miami and my home is again what a home should be. — Don't know yet whether I can make the reunion, but certainly hope I can."

Add to 1911 vice-presidents: Thorne L. Wheeler, X, who in early February reached that office with Arthur D. Little, Inc., chemists and engineers of Cambridge. Congratulations! Speaking of "v-p's," Heinie Zimmerman, IX, Vice-President of United States Steel Corporation, spent two days in Worcester this week visiting the Worcester plants of the organization and, of course, made his headquarters at Hotel Bancroft. We had some nice reminiscing — to be continued at Plymouth the first week-end in June. Eric Keibon '12 spent a day here this week, also.

Plan to attend Alumni Day at M.I.T. on June 8, 1936

1911 Continued

Fred Daniels, VI, general manager of Riley Stoker Corporation here in Worcester, in a recent newspaper interview stated that "because of a revival in the public utility field his company was doing its best business in many years, receiving a large number of orders for equipment from utility firms." — Marshall Comstock, VI, says: "My daughter, Barbara, is a freshman at Radcliffe, which makes me feel ancient"; Cal Eldred, also VI, adds: "There is a future 'financial giant' now in his junior year at Dartmouth, called Cal Eldred, Jr."

In a recent issue of the *Electrical World* is an ad showing a fine desk study of a classmate, with the caption, "Follow a day's work of Tom Haines, superintendent of the distribution department, Edison Electric Illuminating Company, Boston." After enumerating various interviews, conferences, and the like, it adds that for 20 years he has found time to read this magazine. It is rather an interesting full-page spread.

Frank Osborn, sending in his class dues from Chile, South America, says: "Would like very much to be with you in June but it is out of the question. Best wishes for a successful reunion — fair weather, 'n everythin'."

Here are some new addresses from the Alumni Office for classmates from whom your Secretary would be delighted to hear: Rev. Thomas J. Burke, V, St. John's Church, North Bennington, Vt.; Ove Collett, III, Halvdan Svartes Gt. 16, Oslo, Norway; Samuel L. Hayes, 2211 Radcliffe Avenue, Charlotte, N. C.; Ivory S. James, III, Carnehan Mines, Carnehan, N. M.; W. Rowe McCune, II, Greens Farms, Conn.

So, classmates, we come to the final admonition to be sure to bend every effort yourself and help swell the attendance by persuading other classmates to attend our gala Twenty-five Year Reunion at Mayflower Hotel, Plymouth (Manomet Point), Mass., June 5, 6, and 7, and Alumni Day at the Institute, Monday, June 8. Also write to Dennie! — ORVILLE B. DENISON, *Secretary*, Hotel Bancroft, Worcester, Mass. JOHN A. HERLIHY, *Assistant Secretary*, 588 Riverside Avenue, Medford, Mass.

1912

A letter from Harold Mabbott, II, tells us of appointment of Alfred J. Green, son of W. P. Green, I, to Annapolis. He also gives us news of Jesse Hakes, I, who is still in Baltimore at the same stand and reports business improving. Johnny Noyes, II, who is now southwestern district manager for the Sullivan Machinery Company, gave Mabbott a call while passing through Kansas City. Johnny has so much territory to cover now that he has to do it by air, as neither the trains nor his good Buick are fast enough. Mabbott reports that he is getting his diploma from Fort Leavenworth in June and anticipates foreign service. He asks that we make the distinction between a diploma from Fort Leavenworth and a pardon from Leavenworth. Knowing Mabbott, this hardly seems necessary.

Harold Manning, X, Waterbury patent lawyer, reports business good in the Nutmeg State. — FREDERICK J. SHEPARD, Jr., *Secretary*, 125 Walnut Street, Watertown, Mass. DAVID J. McGRATH, *Assistant Secretary*, McGraw-Hill Publishing Company, Inc., 330 West 42d Street, New York, N. Y.

1914

On February 6 Charlie Fiske and his New York gang staged the usual enjoyable dinner in Greater New York. It was held in the same building as the Technology Club of New York, and it is needless to say that it was a most successful affair. This meeting is getting to be the real annual gathering for '14 men, and it is hoped that as time goes on more and more from places just outside New York will be able to get in to this event. Among those prominent at the meeting were Sousa Brooks, who told of recently registering at the Hotel Syracuse and finding the next two men in the registering line with him to be Stan Merrill, representing the Stetson Shoe Company, and Buck Weaver, representing Johns-Manville. This certainly was an interesting coincidence. Sousa insists that none of the group mentioned patents. — Commander Richey, who is still stationed at the Brooklyn Navy Yard, enlivened the meeting with his humor and genial personality. We feel it a great compliment to the Class to have him attend these meetings, since he has a joint allegiance to the Naval Academy and to Technology. — The meeting welcomed Gus Miller to New York, Miller recently having arrived after several years' stay in Chicago.

Bill Simpson proved the condition of his health by being able to repeat on request that the McGraw-Hill Publishing Company had just published a book entitled "Unit Process in Organic Synthesis," to which he had contributed the data on sulphonation processes. — Vernon Tallman and your Secretary represented the far-off contingent who journeyed from Boston to the meeting. Tallman insists that he does not know where his headquarters are because of the large amount of traveling he does, but that he is certainly planning to make his future trips coincide with the annual New York meeting. — Buck Dorrance had planned to attend but was prevented at the last minute. We indeed missed him, and, as Ross Dickson mentioned, half the fun of the evening was gone because he could not query: "What, no onion soup!" — Those attending the meeting were: Affel, Perley, Dickson, Somerby, Crankshaw, Gould, Tallman, Hines, Richey, Ober, A. H. Miller, Simpson, Duffield, Owen, L. A. Wilson, Brooks, O. C. Hall, Calver, Fiske, and Richmond.

Before the meeting we also had the pleasure of seeing A. V. Swift and Eugene L. Macdonald '13, who were attending another meeting in the same building and visited us for a while. — Edgar H. Davis was unable to attend the meeting but in answer to Charlie Fiske's questionnaire sent in the information that his book en-

titled "Terror on Compass Lake" was the Crime Club Mystery Novel for last November. As far as your Secretary knows he is the first member of our Class to make one of the monthly club book series. — Harold Danforth was also unable to attend but he wrote that he is now located with the Public Service Commission of New York State at its Center Street, New York, office, instead of with the New Jersey Telephone Company as formerly.

Plans are progressing rapidly for Alumni Day. It will be recalled that this idea was greatly aided by our President Buck Dorrance's feeling that something was lacking at our 20th reunion, namely, the contact with Technology. He thought that it would be splendid if we could all start from Technology or return there at the conclusion of the reunion. This idea appealed to many other classes and a plan was worked out whereby Alumni Day would be held on Monday preceding Commencement. This would make it possible for the five-year classes to come to Class Day following their reunions. The plan is too new to determine its ultimate success. Other considerations have arisen: No small number of the Alumni have stated that they felt that the five-year reunion was all that they could stand at one time, but that if Alumni Day were held on a Saturday, they would expect to attend it from time to time quite independent of the five-year reunion. If a Saturday were to be chosen, it is quite probable that it would be earlier in the year, such as the first part of May, when the students were still at Technology. The relations between the alumni body and the Corporation and Faculty are most important and, at the same time, very difficult to maintain. Your Secretary would greatly appreciate it if those of you who are at all interested in this contact would write him, giving your specific ideas on this whole, broad subject of contact, particularly on Alumni Day. In any event, if you can possibly do so, try to be in Cambridge on Monday, June 8 — a real program is awaiting you. — HAROLD B. RICHMOND, *Secretary*, 30 State Street, Cambridge, Mass. CHARLES P. FISKE, *Assistant Secretary*, 1775 Broadway, New York, N. Y.

1918

Perhaps it is a result of the hearty, thoroughgoing way politicians are throwing insults at each other through the astonished air. Maybe it is a consequence of the tired ERA worker wishing to go "down the valley of a thousand yesterdays to the land of forgetfulness" via the notes of music and poetry which can be plucked at eventide in an unquenchable stream from a little copper wire stretched along the ridgepole. Then again it may be due to just plain, sound business sense. Be that as it may, Eli Berman's 62 Stuart Street radio store has spawned magnificently into four stores, one of which is located in Central Square, Cambridge, where its window display reminds us each night that there is still no radio in our car to soothe us amid the jangling distractions

1918 Continued

of traffic and policemen. Our very stubbornest sales resistance is gradually weakening.

In the Building Arts Exhibit at 182 Tremont Street, Boston, held February 17 to 29, Bill Wills — that perennial old giver of noteworthy items — held an exhibition of sketches and photographs of his houses. Does Bill sometimes get a kick out of thinking of the ancestral voices that may some day whisper in the halls of those houses — voices of men that have been dust for a century!

There are those of us who just couldn't wait till spring to tie our belongings in a bandanna and be off to new places amid a dither of conflicting emotions. J. Alston Clark is at 114 Sage Place, Ithaca (Cornell, we suspect). Edgar W. Huckins left Boston for 421 New Post Office Building, Atlanta. (So, you couldn't stick the New England winters!) Masayuki Tatsuno turns up at 653 Kinuta Seijo, Kinutamura, Tokyo, Japan. Bob Van Kirk, Jr., gets his mail at 2319 Harrison Street, Evanston, Ill. (How about an account of some glamorous adventure, Bob?) — F. ALEXANDER MAGOUN, *Secretary*, Room 4-136, M.I.T., Cambridge, Mass. GRETCHEN A. PALMER, *Assistant Secretary*, The Thomas School, The Wilson Road, Rowayton, Conn.

1921

The Norwich Inn, two miles from Norwich, Conn., will be the Mecca of the Class next June 5, 6, and 7, it has been announced by Dan Harvey, chairman of our 15th reunion committee. Detailed information of our big celebration has been mailed to everybody, and if any announcements fail to arrive, please notify Dan at the address listed at the bottom of these notes. On receipt of your notice please return the acceptance form promptly, marked "I shall attend," so reservations will await your arrival.

As news of the June jamboree arrives, the excellent program of *divertissements* is particularly appealing. Located on Route 32, Connecticut's highway system provides an enjoyable motor trip to the Norwich Inn, nestled amidst rolling hills, placid lakes, and sylvan woods in the heart of the state's pastoral charm. Comfortable accommodations await us at the end of the journey in a beautifully located spot, flanked by spacious lawns and terraces, where a thoroughly modern and extensive hostelry retains, nevertheless, all the early Colonial simplicity. Sun porches and dining halls overlook Trading Cove, once the site where Indian canoes put in for barter with the white men. The golf club supplants the war club on a sporty 18-hole course which stretches over a historic battleground. Tennis, horseback riding, baseball — even horse-shoe pitching — are on the program. Evening amusements include: card games, table and deck tennis, shuffleboard, Larry Conant's singing (?) class, and also "Monopoly," if you insist! The reunion program will extend through Sunday noon, June 7; transportation to Cambridge will be available to all that afternoon for attending Alumni Day, June 8.

Dana E. Kepner, purveyor of water-works equipment, is such a loyal member of the Class that he has chosen 1921 Blake Street as his address in Denver, Colo. Here he maintains his own company, selling Diesel engines, turbines, meters, pipe, valves, and miscellaneous water-works and sewage equipment and chemicals. In a long letter to Ray, promising to bring some good stories to the reunion, Dana tells of the fine vacation he and his family spent at Balboa Island, Calif., last summer. As is usual with all of the Class who visit there, he is loud in praise of the kindness and courtesy extended by the Jackson W. Kendalls of Pasadena. Dana reports that Jack has sold his transfer company business and is now assistant engineer of the California Railroad Commission with headquarters in the State Building, San Francisco. Here's hoping Dana, Jack, and Archie Mock bring the entire Western contingent to the Fine Fifteenth.

Reunion reminder. Return the application now and get your neighbors to do the same. Local committees will arrange travel parties for those who wish to go in a group. Everybody reserve the dates in June! A. D. Harvey, *Reunion Committee*, Nash Engineering Company, South Norwalk, Conn. — RAYMOND A. ST. LAURENT, *Secretary*, Rogers Paper Manufacturing Company, Manchester, Conn. CAROLE A. CLARKE, *Assistant Secretary*, Acousticon Division, Dictograph Products Company, Inc., 580 Fifth Avenue, New York, N. Y.

1922

The following communication has been received from Royal A. Stone: "The February Review cover stirs in me the same urge to write that a picture of the Sunnyside Yards might in a Long Island commuter, as it is very familiar to those of us who travel to Camden. Having been plying back and forth just down river from or driving to and fro over that arch to R.C.A.-Victor for some time, I recognize it as a daily accompaniment. The view fortunately omits or plays down the usual shade of the water and the aroma. The work as plant engineer there is large and wide and is interspersed with many variations and interludes such as a present drive to rearrange most of the production equipment in one group of buildings on different patterns. G. P. Anderson recently joined the R.C.A. family and I see quite a lot of him. I also see M. W. Williams regularly, as he lives nearby in Jenkintown, and others occasionally at Tech dinners here, including Bill Stose, Ted Wray, Phil Alden, and C. A. Newton '21. This unfortunately is by no means a complete list of the classmates or near ones in the City of Brotherly Love and vicinity.

"I feel called upon to mention also the untimely passing of my wife late last year. So many Tech men and their families have known her in the various places we have lived. I am blessed with two energetic and amiable patterns of her, however, Billy, 10, and Frank, 7. We are holding out at the same address, 957 Foulkrod Street, Philadelphia, as when she wove her life

into it as home. I hope any Tech friends and classmates will pay us a visit 'en-long-route' or short one."

The New York *Herald Tribune* recently carried the following: "Mrs. Thomas H. Morgan, of 222 West Seventy-first Street has announced the engagement of her daughter, Miss Margaret Morgan, to Mr. Wyatt Hawkins Ingram, 4th. Miss Morgan is the daughter of the late Dr. Thomas H. Morgan, an eminent surgeon of this city. She attended the Veltin School, Smith College, and Columbia University. Mr. Ingram is on the teaching staff of the College of the City of New York. He attended Stanford University, was graduated from Chicago University, and has advanced degrees from M.I.T. and Cambridge University, England. Mr. Ingram is descended from the Wyatt family, prominent in the early history of Virginia, and is also descended from Catherine Bushrod, sister-in-law to John Augustine Washington."

The following comes from Bill Nueser, who is associated with Moran and Proctor, Consulting Engineers, 120 East 41st Street, New York: "Last week was the annual meeting of the American Society of Civil Engineers here in New York, and while there was a large crowd at the smoker, I saw very few '22 men. As a matter of fact I missed 'long-legged, red-topped' Ted Wray, who is usually there. However, I did see Bill Rapp, who is still with McClintic-Marshall, and Jack Halpin, who is with the New York Central Railroad; both seem to be enjoying good health. As a matter of fact, Jack lives in Ossining and about a year and a half ago married a girl from Tarrytown whose maiden name was Halpin (no relation, so far as they can trace). Al Reinhardt is back from his wanderings in Europe and now has his office in the New York Stock Exchange Annex; he is not doing much, but is otherwise in good humor. While at the smoker last week I met Dana Kepner '21, who motored from Denver, Colo. He seems to be doing well in the sale of machinery and equipment for sanitary and water-supply systems. Also saw Si Freese '21, who has his own firm of consulting engineers in Fort Worth, Texas. He also is in the water supply, and so on, field of engineering, and seems to be doing very well.

"As for myself, I am still with Moran and Proctor, who are foundation specialists. I am enclosing a partial list of jobs, so as not to have to repeat the same. (Here Bill has inserted a typewritten list of four pages of single-spaced type, listing practically every bridge, dam, tunnel, power house, and public building you ever heard of. This list is on file with the Secretary and will be furnished on request.) This past fall we have been working on the New York World's Fair and designed the foundations for the Soviet Palace in Moscow, Russia. This building is 1,400 feet high (240 feet over the Empire State Building) and covers an area of 26 acres. The completed structure, based on New York prices, will probably cost \$125,000,000. I get around the country some, depending, of course, on where we have

Plan to attend Alumni Day at M.I.T. on June 8, 1936

1922 Continued

or may get jobs. This has, however, not required any trips to Rochester, otherwise I would have stopped in to see you and some of the others. I might add that our family was increased to six last fall, with the arrival of a new daughter, which now makes: girl (8), two boys (5 and 4), and a girl. That's engineering it!"

The following from Dale Spoor, 3031 Sedgwick Street, Washington, D. C.: "It certainly was a pleasure to see 1922 again represented under the class news in *The Review* and I hope that you keep up the good work. My first New Year's resolution was to give you a hand in whatever little way I could by at least sending in news of myself. I have been with the Air Reduction Sales Company nearly eight years, having been moved from Los Angeles to Sacramento, Calif., thence to New York City, Philadelphia, and now to Washington, D. C., and have been here for about nine months. The Air Reduction Sales Company manufactures everything in connection with welding and cutting; with all the government activity, it was decided that somebody should be here to see what it is all about. I ran into Billy McMahon, who has a very good job with the Rosslyn Gas Company, at a Tech lunch recently, and also had a pleasant chat with Professor Doten and Dr. Tyler, who were there. I occasionally see Captain Howard F. Clark '12, who has quite a responsible job with the District of Columbia, and whom you will remember as the military training instructor when we were at Technology. The only vital statistics I have to report is the same wife which I have had for nearly ten years now. Keep up the good work and let's have some regular news."

Johnny Strieder now reveals that he was married on August 17 to Dr. Helen L. Roberts of Dallas, Texas. Inasmuch as Johnny is an M.D. himself with an office at 171 Bay State Road, Boston, it would seem that this 100% medical atmosphere must establish some kind of a class record. — Hugh Shirey is now assistant manager of the Rochester office of the brokerage house of Tucker, Anthony and Company. — C. KING CROFTON, *Secretary*, Rochester and Pittsburgh Coal Company, 604 Lincoln-Alliance Bank Building, Rochester, N. Y.

1923

Just to prove that life now and then outstrips Mark Hellinger and — what was his name? — O. Henry, we're going to tell you the story of the two Malcolm Johnsons. The first Malcolm Johnson is the *Sun's* night-club reporter. On Christmas Eve, the Paradise Restaurant, brimming over with good will toward night-club writers, dispatched to this Johnson some nice liquor. They sent it to the address they found in the telephone directory — 102 East Twenty-second Street. The next day they called up the *Sun* office and asked Mr. Johnson if he had received his little present all right. Mr. Johnson said, No, he hadn't; where had it been sent? "To 102 East Twenty-second Street," the Paradise Restaurant said sharply. "There's only one Malcolm

Johnson in the phone book." "Well," said the *Sun* Malcolm Johnson, "it's not me." This worried the Paradise Restaurant terribly, and they sent a man down to East Twenty-second Street to see what was up. He rang the bell at Number 102 and a happy-looking man answered. An enormous party was going on within. "Did you," said the Paradise emissary, "happen to get some liquor from the Paradise yesterday?" "I sure did," said the other Mr. Johnson. "And not only that, but every other night club in town sent some. I don't know why. But come on in and have a drink." It turned out that the Twenty-second Street Johnson works for Doubleday, Doran and doesn't bother much about night clubs. Doesn't have to if it comes to that. . . .

The foregoing paragraph is wholly a quotation. Your Secretary read it originally in the January 4 issue of the *New Yorker* and the name sounded vaguely familiar, mental identification finally placing it with VooDoo and Tech Show. It was only routine to check this and the item was laid aside with true reporter's satisfaction at having found an item to be mentioned in these notes. When I made up the March notes in Houston last month, the Johnson item had been left at home. While ordinarily news does not improve with age, the number of people who have called my attention to the item since it appeared is enough to convince me that it should be here reproduced in full for the benefit of those who did not see it in the *New Yorker*.

One of those who sent the item along was Carole A. Clarke, Assistant Secretary, '21, who said he was hastening to call Johnson and find out if there was any good cheer left, an idea which undoubtedly has occurred to others among Johnson's wide acquaintance of Technology men of the classes circa 1920 to 1923, who read the item when it first appeared or who will read it here.

I have a note from George Nesbitt on stationery which identifies him as treasurer of Dassonville Company, Ltd., manufacturers of charcoal black photographic papers in San Francisco. He reports: "The significant event underlying my recent change of address is that we now get our mail by a route that goes past our home instead of a block away. I am afraid that will not be a very succulent bit of news. I doubt if there is any happening of my recent life that would be of interest, for I have been living and working just as now for four years; I think you have probably covered that already." Well, I hadn't; but it's done now.

Charlie Robinson brings me up to date on himself: "I started last September as head of the science department at the North Shore Country Day School in Winnetka, Ill. For the past four years I have been connected with the Keewaydin Camp at Timagami, Ont., as head of the younger boys division, taking canoe trips all summer. I have one son, age 10, and a daughter, age 8, both attending North Shore Country Day School. Have an amateur radio station W1GHS, but have not received my new call for this location."

The New York 1923 Club had scheduled its annual dance for February 21, and having no information to the contrary I assume it was probably held then. Plans for an occasional luncheon, smoker, or dinner of 1923 men in and around Boston may come from a discussion of the possibilities of one such which took place when your Secretary, Howard Russell, Frank Haven, and George Johnson had lunch together last week. — HORATIO L. BOND, *Secretary*, 195 Elm Street, Braintree, Mass. JAMES A. PENNYPACKER, *Assistant Secretary*, Room 661, 11 Broadway, New York, N. Y.

1924

From the New York *Times* we learn of the engagement of Azel Ames, Jr., now resident surgeon of the Cincinnati General Hospital, to Miss Josephine Church of that city. Dr. Ames, following graduation in 1924, studied at the College of Physicians and Surgeons of Columbia University and later was on the staffs of the Presbyterian and New York Hospitals and Johns Hopkins Hospital in Baltimore. No date for the wedding was announced.

Bill Sturdy, a member of the staff of the Bell Telephone Laboratories in New York and also a captain in the signal corps reserve, United States Army, has been appointed commanding officer of the 77th Signal Corps Company, we learn from the *Taunton Gazette*. — Wink Quarles, we understand, is still one of the mainstays of the McGraw-Hill Publishing Company and a recent note to *The Review* office indicates that he has moved from Chestnut Hill to Whitemarsh, Pa. — Tom Rhea has recently moved from Shreveport, La., to Pittsburgh, where he is located with the General Electric Company. — Frank Hecht reports that he may be reached at the Ebasco Services, Inc., 2 Rector Street, New York City, but we have no inkling as to what sort of services he has to offer. — Bill Hand, it is reported, has moved from Glendale to San Bernardino, Calif. — Another classmate who has moved recently is Lawrence Corbett, who is now of Worcester, Mass., formerly of Ben Avon, Pa. — FRANCIS A. BARRETT, *General Secretary*, 50 Oliver Street, Boston, Mass.

1926

I have before me the folder of returns on our first Tenth-Reunion mailing and it is most encouraging. As of February 27 the following men have indicated their intentions of being present at the reunion: William P. Lowell, Jr., Charles F. Kirsch, Thornton W. Owen, William H. Latham, Arthur E. Benson, Eliot N. Bidwell, Rufus L. Briggs, Sydney Dach, Maurice W. Davidson, Robert T. Dawes, Samuel G. Eskin, Emerson W. Eddy, Malcolm B. Epstein, Ralph A. Hammar, Eben B. Haskell, Giles E. Hopkins (probably), Harry F. Howard, Howard Humphrey, John B. Jacob, Herbert J. Kaufmann, J. Rhyne Killian, Jr., Albert C. Lamoureux, Arthur H. Lane, Richard S. N. Li, Dwight K. Luster, John E. McMaster, Ronald J. Martin, Nathan Pearlstein,

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Richard H. Pough, Sumner S. Randell, Jr., Charles Rich, Philip M. Richardson, Robert W. Rogers, George W. Smith, Alfred P. Steensen, Flint Taylor, Cedric Valentine, Earl C. Wheeler, Abraham White, Harold A. Willoughby.

This list is, of course, incomplete, because returns are still coming in daily and the reunion committee is expecting more than 100 for the events in June. The committee welcomes the suggestions that are being returned on the questionnaires for making the reunion as pleasant, notable, and successful as possible. Those of you who have not yet returned the questionnaire are urged to do so, and if anyone by any chance did not receive the reunion announcement, we would be happy to send one posthaste.

Donald Green, who is with the Standard Oil Development Company, has returned from Louisiana to Elizabeth, N. J. — Samuel McMurtrie, Jr., one of the Rogers group, is now at Sante Fe, N. M. — There is one new addition to our foreign legion: Juan T. Villanueva, who is with the Metropolitan Water District in Manila.

The Class is well represented, we find, in the New York City departments: W. H. Latham, Park Engineer, Department of Parks; E. J. McGrew, Jr., First Deputy Commissioner, Department of Plants and Structures; M. L. Radoslovich, Supervising Draftsman, Department of Parks.

Donald King, who is with the Carbide and Carbon Chemicals Corporation, recently visited the Institute, looking for new men for his company. — Charles S. Draper has been in the limelight recently for research work he is doing in the Institute's Engine Laboratory and in the Instruments Laboratory of the Department of Mechanical Engineering.

With an appropriate amount of coyness, the Secretary reports a recent letter from the Squire of Hartford, Conn., Thomas D. Green. Inspired by the article in the February Review containing a collection of conundrums, Tom submitted a tough one that has been bothering him for a number of years. It was promptly solved by our conundrum editor. "If you regard it as news, you may publish in the class notes that I take more pleasure in reading your sheet than I do *Time*. In order to remove any possible ambiguity from that statement, let me say that I especially appreciate being guided to the juiciest bits in the class notes and the remarkable balance you preserve between good engineering writing and entertainment." — J. RHYNE KILLIAN, JR., *General Secretary*, Room 11-203, M.I.T., Cambridge, Mass.

1927

We had a very nice letter from Lester Payne telling us that he is now a captain in the Army and assigned to Headquarters 1173 RD Company of the CCC at Mount Tom Reservation, Camp Number 11029, Holyoke, Mass. Les is in charge of 220 men and the work they are doing in that section of the country. He reports that the camp is about three miles from the center of Holyoke, and he would be very glad to have any of the Class in that area

call upon him. He adds the further incentive that there is a free meal waiting for any of those who accept his invitation.

Bill Reed, in his capacity as sales executive for the road tar department of the Koppers Products Company, spent a week at Cleveland early this year, attending the Road Show. He saw Tom Russell and George Bergman, who were at the show representing Sullivan Machinery. Tom is district manager in charge of the Chicago office, having been transferred to Chicago from Washington. George is representing Sullivan in the St. Louis area. Bill talked with Hank Steinbrenner on the telephone when in Cleveland, but did not see him. We are unable to report anything about Hank's business or family affairs. For the information of those who may get to Pittsburgh, Bill is now living in the South Hills, and will be glad to hear from any of the boys who come there.

Bob Dexter, who is still well known to us for his ability as a saxophone player, has redirected his efforts along a very interesting business venture. In the latter part of 1933 he hired some floor space in a building near Cottage Farm Bridge on Commonwealth Avenue, Brookline. He had a keen interest in woodworking as a hobby and decided that there are many other people in the Boston area who have similar interests, yet do not have the equipment or the knowledge to pursue this hobby. Therefore, with the space hired and the idea, Bob purchased lathes, band saws, jig saws, and all the other equipment that goes with a fully equipped woodworking shop. He then opened up his new venture, known as "The Shop," where members of this club, as the venture becomes organized, can work with wood to their heart's content and receive expert instruction and advice in wood turning, carving, finishing, and general cabinet making.

Your Assistant Secretary attended the Hobby Show at the Horticultural Hall in Boston in the early winter and saw the exhibit that "The Shop" had there. The very cordial invitation which was offered was accepted a little later and your Secretary was greatly impressed with "The Shop" and its idea. Bob would be pleased to have any of the Class call upon him at "The Shop," renew acquaintance, and see how one of our number is able to make a business of a hobby.

A bit of information which is now at least one year old is that Lin Gentry moved to California early in 1934 from Hagerstown, Md., after having lived in Hagerstown for two years. Lin is married, but has no children, or at least had no children a year ago. — Ralph Stober has been promoted so that he is now in charge of the efficiency department of the Simplex Wire and Cable Company, Cambridge. Ralph is living on Cabot Street, Newton, next door to Bob Dexter. — We learned that Bob Wise is in Florida at the present time, having just completed a cruise to South America. The ice-cream business is not too rushing at this time of the year and Bob has found southern trips a pretty good way to pass the winter.

Dick Hawkins has been transferred from the Boston office of Minneapolis Honeywell Regulator Company to the Philadelphia branch. On last reports Dick was still unmarried. — JOHN D. CRAWFORD, *Secretary*, General Radio Company, 30 State Street, Cambridge, Mass. RAYMOND F. HIBBERT, *Assistant Secretary*, The Gill Corporation, 238 Main Street, Cambridge, Mass.

1928

It has been such a long time since we had some Course X news from Al Gracia that it seems fitting and proper to quote the whole, short letter which Al recently mailed to us from his present address — 1639 Ohio Street, Cuyahoga Falls, Ohio: "It seems that I really should drop a line to refute Dick Hoak's quaint claim that I 'appear to be suffering from an acute attack of dry rot.' As all other class secretaries will testify, for us 'the postman only rings twice,' and that the first year out. The postman has rung for me and having passed the news on I would have been obliged to recount my own comings and goings these many years if I had written class notes. — Dick's inimitable style has changed not a whit and his metamorphosis from chemical engineer to bacteriologist is in line with his remarkable versatility. I can see him now as he moves about with his *Colon Aerogenes* bacteria discoursing to them on the advantages of having been born Pennsylvania bacteria as compared, for instance, to nativity in New England.

"A Christmas card from Herb Dayton from Houston, Texas, reports that his family and himself are well and prosperous. Herb's family is composed of Mrs. Dayton and five-year-old Dick. Herb reports that Jamison is married to an Oklahoma girl and is working with an oil refinery on the other side of the channel — which may place it for you but not for me. He states also that Bill Woods and family are in Houston.

"The only Course X man I have seen recently outside of our Akron representatives was Maurice Beren. I met Maury at the Chemical Exposition in New York during the first week in December. We had a little chat and he told me that Bob Proctor was a neighbor in Leominster, Mass., if my memory serves me correctly. It was mighty nice seeing Maury after seven and a half years. — As our Course X Akron contingent, Bud Reynolds and myself are still working for Goodyear. Bud is in supervision in the production department and is now the proud father of two fine children, a girl and a boy. I'm working in the chemical engineering division and enjoy the work, which is developmental in nature. The Gracias are now three, having been made so by the arrival of Janet in July, 1934. — There my news comes to an end and I return to my condition of 'dry rot' until the 'postman rings again' or another 'Hoakian' job startles me out of hibernation."

Slim Maeser is now with the United Shoe Company and is living at 34 Whitney Avenue, Beverly, Mass. The Maesers have a young daughter, Doris Jane, who

Plan to attend Alumni Day at M.I.T. on June 8, 1936

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was born on August 6. Congratulations, Slim! — We now have the pleasure of announcing in these columns the marriage of Chuck Carter to Miss Phyllis Mairn Rees. The marriage took place in St. George's Church, Montreal, Quebec, last September. — The engagement of Miss Dorothy Doelckner and Bob Hunn was recently announced. Their wedding will take place early this spring.

Only the first day's replies to the letter mailed to the Class on February 18 have been received. Thirteen letters came in the first day, nine of which contained either a check for a dollar, or a dollar bill, which was requested to provide a class fund for undergraduate athletics and pay for the expense of printing, handling, and postage on the 625 letters which were mailed out to classmates. In the next month's issue of *The Review*, we shall include individual comments from as many of the fellows who replied as possible (others will follow in subsequent issues) and we shall work in some facts obtained by statistical analysis of the replies received. These should be quite interesting. For instance, the first day's replies show that six out of 13 of our classmates are still single; of the remaining seven, five have families including children. In this first group, baby girls outnumber baby boys six to two. Watch for the next issue for further vital statistics. — GEORGE I. CHATFIELD, *General Secretary*, 5 Alben Street, Winchester, Mass.

1933

Information is very scarce this month; I guess all the boys are busy compiling their income tax reports. Since that is a good sign of progress (if correct), we won't complain. — A note from Gordon Pratt tells me he is now in Chicago living at 5627 Kenwood Avenue. He states also that Wallie Bohrer is a toxicologist for the state of Rhode Island, and that Basil Parker married Miss Ann O'Hara during the latter part of 1935. It sounds as though Course VII is going places.

Jack Andrews tells me of Bob Forbes doing: Bob is with the United States Army Engineers and claims a record of some sort or other for having lived in his 21st home in little over a year. That sure is a record which deserves recognition! Are there any challenges out there among readers of this column? We would like to hear from you. — GEORGE O. HENNING, Jr., *General Secretary*, 163 Barbey Street, Brooklyn, N. Y. ROBERT M. KIMBALL, *Assistant Secretary*, Room 3-107, M.I.T., Cambridge, Mass.

1934

I realize that I have not had any class news in *The Review* for the last three issues, but I hope to make up for the lost time in this one. My first bit of information comes from Stead Wright. I have had his letter for a long time, but some of the news it conveys may still be fresh for some of you. Miss Jean Ogg dropped that name and became Mrs. Lyman Allen, Jr., on October 26. The wedding ceremony took place at the Trinity Episcopal Church in Newton. Stead himself acted

the part of head usher, and Bill Baker and George Hatch were there to assist him. Mrs. Allen comes from Cincinnati, and it is there the couple expect to return, with Lyman taking on a new job with Procter and Gamble, something to do with gas-fired furnaces. From there he was expected to go to New York and, finally, to Memphis, Tenn. All this is to cover a period of one year, which, if I may say so, will make a swell honeymoon, aside from the work connected with it.

Bill Baker, whom I mentioned as having been one of the ushers at Lyman's wedding, will probably be asking some of the boys to do the same thing for him soon. As the story goes, Bill has been handing out cigars recently, all because he and Miss Ruth Stuart, who hails from Danvers, have announced their engagement. Bill, like many other Course XIII men, has been at Fore River, Quincy, as a welder's helper since graduation. He is now working in the Hull drafting rooms, where he spends his days drawing small rivet holes on blueprints.

Bob Elliott is still haunting the classrooms at Technology as a teaching fellow while pursuing courses for his doctor's degree. Instead of studying for two years and then taking a crack at the exam, Bob did the unusual by passing the exam the fall after graduation and is now putting in his time and doing his thesis. What is more, he expects to have that sheepskin within a year. Another student is Ernie Andrews who is attending some university or other in St. Louis, where he is working for a degree in either botany or biology. Ernie spent last year at Amherst.

To come back to Stead, he has had a varied career during the past year and a half. The Riverside Boiler Works in Cambridge claimed his services during the summer of 1934 and when they folded up he landed a job with the Sawyer Lumber Company in Worcester. After working as a steam fitter in their air-conditioning department for a few months, he was transferred to the office where he was put on direct engineering problems. All this lasted until August, at which time they let him go because of the heavy running expenses at the plant. Stead, at the time he wrote, was making heating layouts for customers of Sears, Roebuck and Company all over New England and eastern New York, but he had fears that his job would end with the close of the active heating season. While in Worcester, Stead ran across Chet Tudbury, who said he had a job with the New England Power Association. Professor Pratt '24, who left Technology a year ago, was there, too, working for the American Steel and Wire Company, and so was good old Obie Denison '11 who is acting as promotion manager at the Hotel Bancroft.

Carl Stratton and Stan Lane, who are with the American Smelting and Refining at East Helena, Mont., apparently lived through the hundreds of earth tremors that shook that district during October, but they did come home one night to find a good portion of the ceiling on their

beds. — Ed Locke has finished up his Army career and is now becoming a metallurgist at the new plant of the Garrison Engineering Company in Great Barrington, Mass. Ed and Mrs. Locke are reported to be very happy in their new home, and entertained his mother and dad over Thanksgiving there.

Bill Wessel has finally fallen into some luck. He landed a job with the American Metals Company and sailed on December 17 for Matlahambre, Cuba. Until that time he was working in the real estate racket and put in his spare time climbing mountains in Maine with Jack Eames, Bill Lewis, and Bob Jackson. He says they got up to 5,267 feet in one place and suggests that that probably means only a little hill to me. I'm afraid you're right, Bill. — A last minute flash (written on the back of a Christmas card) announced to me that, after spending his week-ends tearing from Providence to Stamford, Conn., George Fowles got wise to himself and married Beth Hennicker. — A report also came to me that Larry Stein beat up Freeman Hudson something awful. Actually there is little truth to the whole thing, because it all happened at a blow-out held at the German American Athletic Club in New York, where a bunch of the fellows were holding forth. After the bouncer of the place had requested that they all leave and the inebriates were all lead out quietly, Hudson came out, slapped Larry a wallop on the back, and after Larry had swung and missed a punch at Freeman, the former (or the latter, at any rate, Freeman) insisted that no little so-and-so could beat him up and get away with it. So there it is — Freeman claimed that Larry had done this and Larry himself feels rather proud of his feat. — Ed Loewenstein is working hard for a firm of architects in Chicago, remodeling old houses. At night he does some private work for friends of his. — Syd Nashner has leave of absence from Technology, is working in Hartford, and goes back to "brown-bag" over week-ends. — Larry Stein is now working in Newark, N. J., with a jewelry concern.

Now for some smatterings of news from here and there: George McCaulley, after staying in Oklahoma for a year designing oil derricks, is back at the Institute. — Red West is in Montreal working for a new Canadian airplane company. After the regular designer quit, Red and another fellow had to learn designing in a hurry, and despite these handicaps, a plane was built and tested satisfactorily — which is not bad for a Course II man. — Obie O'Brien is now mess officer at a CCC camp in Melrose. We hope he feeds the boys better grub than we got at Walker up until a couple of years ago. — Johnny Hrones, who always did have a knack for breaking up things, is now an assistant in the Testing Materials Laboratory at school. Johnny, if you can remember back that far, did a fair job of banging himself up on the hockey rink. — Sam Joroff's father has not yet learned to appreciate the valuable assets contained in his son, but Sam is

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still working with his dad as general assistant to a general contractor. — Goofy Way moved in with Tuffy Emery at his place in Jersey City, as did Al Rogowski. Goofy is now with the New York Central Railroad and expects soon to be shipped to their shops in Cleveland. Al is now with the Worthington Pump and Machinery Company and does every type of engineering work imaginable. Tuffy is still with the Barney-Ahlers Construction Company, that is to say, when he is not making whoopee on the snow trains and skiing on the better trails of New England. — Johnny Westfall started a round-robin letter among the members of the varsity crew, and through it we learned that Johnny Newbegin is still working as hard as ever for the Oxford Paper Mills at Rumford, Maine, and is working still harder indulging in his favorite pastimes of mountain climbing and skiing. — Al Mowatt lost his appendix, but his remarks about it are something you will have to ask Westfall about. Ask him also about the colorful language of the shipbuilders of Bath. — Frank Nicoli is studying the operation of one of the plants of Metcalf and Eddy, sanitary engineers, at North Adams, Mass. — Butch Patch is becoming quite the metallurgist, what with his traveling all over the East attending to problems of welding.

There is a bit more that I have not included, but I promise here and now that you will find me spread over more than a page of the May number, so keep your shirts on, and if you want to hear some more about Bolivia, just keep on reading this.

There are some things down in this neck of the woods that might be of interest to some of you, and if you'll bear with me, I'll try to point out a few of them. On alternate Sundays we have a large market in Pulacayo, this being so mainly because pay day comes for the workers every second Saturday and because nothing is sold on a credit basis by these people to one another. The market is situated on a little hill just outside the main gate of the *Campamento* and overlooks all the surrounding country. On a Saturday preceding market day, llama caravans and scores of pack mules enter the small enclosure, bearing all sorts of foods and articles that are sure to find buyers the next day. About four in the afternoon the daily train from Uyuni (the Company's railroad, 31 kilometers from Uyuni to Pulacayo and 12 kilometers more to Huanchaca including a four-kilometer tunnel through the mountain) brings in loads of fresh vegetables and fruit from Cochabamba and La Paz. These are immediately taken over by the *Intendente* (Company-appointed mayor) whose job it is to distribute everything among the people who are actually going to sell to the public — a sort of middle-man proposition. "And so to bed."

Comes the dawn and everybody rushes to market to get the pick of the crop. The first small stands encountered are those of the more prosperous merchants from Uyuni who have brought along materials

for suits, good stuff, too, some of it real imported Harris tweed and the like. They have shoes, socks, ties, good shirts, and on request can and will get you leather jackets, vicuña blankets, silverware, and native rugs. For that matter, they are money changers, and their rates are always far better than those given by the Banco Central in La Paz. Of course, it is all very illegal, but nobody seems to care. The *Bolsa Negra*, or bootleg exchange, always will exist in Bolivia as long as the government tries to boost the value of its currency against the laws of supply and demand.

However, we are still wandering about the market. Next we come across a small stand where are sold sandals, called *ojotas*, for the Indians. Some of them are soled with the shoes of automobile tires, and these are given the name, *llantas*, which is also the Spanish word for automobile tire. Here we see also a slipper or moccasin made of cowhide, *polcas*, which most of the miners wear underground. A little farther on Indian women sell the native wool blankets or *mantas* made in brilliant colors with figures of eagles and condors and of men and women, the more expensive ones made of vicuña wool, the cheaper ones of sheep or llama wool.

A hardware stand carries everything from penknives to axes, padlocks to door hinges, and includes among its wares marbles, rubber balls, and nails. The stock at this stand never seems to diminish or expand from one month to the next, and it may be wondered what the total sales are for a whole year.

Now we come upon the food section. Here are found literally some 50 women squatted, sometimes on a cloth, but more often with their wares merely spread on the bare ground about them. The first thing that strikes the eye of the visitor is the funny, black-looking potato. These are *chuños* or frozen potatoes, a favorite of the natives. Potatoes are found in large quantities, of more varieties than one ordinarily believed existed. There are also toasted beans, which taste very much like roasted almonds. There are corn meal, rice, oranges, lettuce, cabbage, carrots, and *paltas*, which we call alligator pears at home.

Under a shed the butchers hold forth. Meat is sold by the pound. It makes no difference if one asks for a steak, it all comes to you as so many pounds of meat *puro* or *bueso*, which means without or with bone. The difference in price is about half and in the American money it amounts to seven cents or three-and-one-half cents a pound. Of course, one may buy the leg of a bull, in which case one takes home one's purchase, hide, hair, and all. Cuts of meat are unknown to Pulacayans, and after being here for a spell, one also forgets those ware distinctions we call for at home and refers to the meat at a given meal as good or bad, tough or tender.

At the farther end of the market are sold bundles of *tola*, a prairie shrub which is brought in by llama trains and which is used for fuel in place of coal by all but the gringo employees. Each llama carries two

such bundles weighing about 25 pounds each and these sell for 25 to 30 *centavos* — two cents in our money. *Paja*, or tall straw-like grass, may also be bought and this is used in making adobe walls or as a cementing agency on roofs.

If you are hungry and if you have an iron stomach (which is essential for what I am going to tell you), you may stop at any of the dozen lunch stands for a bite. The fare at all of them is the same, namely *chupe*: a goulash, half soup and half meat, of a greasy and almost disgusting flavor. Great pots of it are cooked over a charcoal fire and the customer receives his share on a tin or porcelain plate for 10 *centavos*. You may buy also a piece of roast meat which is weighed on a hand balance (the counterweight being a couple of stones) and handed you as is. Wrappers of any kind are unknown here in the market and each customer brings his own basket or cloth in which to carry home his purchases. Only the Company's store wraps such things as rice, sugar, corn meal, and barley, and then only in a thin paper of the nature of tissue. A gringo shopping alone is always trailed by a group of *chicos*, or little boys, hoping for a chance to carry everything the gringo may chance to buy. The reason is that class distinctions are great and only the lower class should be seen carrying things. They have been brought up to feel that they are beasts of burden and anyone else, a gringo especially, is lowering himself greatly by being seen carrying anything.

On the way out we see the gamblers getting started for the day. The old shell game is under way, as are a number of varieties of it, but most outstanding is a game called *taba*. This game is played with a piece of bone from a cow's leg, cut so that it is about three inches long with the ends planed. Two men only are the active players and they pitch the bone down a court some 25 feet long. It is similar to horseshoe pitching, except that the bone must land on one side, a heads-and-tails idea. All the spectators take part in the betting, each picking his man before the throw.

Prices in the market seem low to us, but to these poor people who make so little they seem unreasonably high. I have already mentioned the price of meat; potatoes cost about \$1.00 for 100 pounds; oranges, 20 cents a dozen; eggs, \$1.35 per hundred. I know most of these prices because for the past seven months I have been in charge of the *Rancho*, or company staff house. At present we are feeding 14 men at an average of \$15 a month for each. Only a week ago I was in Huanchaca doing a few days' work when I chanced upon a real bargain: Two Indians were there from a place called Toropalca, some 250 kilometers away. They had come on foot accompanied by three mules loaded with 1,200 peaches, and the trip had taken six days. In addition to the peaches, each mule carried its own rations and those of its two Indian owners. The peaches were packed in straw packages which were tied securely with hide rope and fastened to the mules'.

Plan to attend Alumni Day at M.I.T. on June 8, 1936

1934 Continued

backs. None was any the worse for the trip or the heat encountered. I found the Indians selling their wares for Bs. 1.60 (11 cents) a hundred. Naturally, I bought a great quantity of them and brought them home for our cook to use in pies, preserves, and as plain fruit.

Chickens are rare at present, but are bought alive, for anywhere between 21 and 35 cents a chicken. Most of them are scrawny, underfed birds, but give them a week or two of feeding on the leftovers from our table and a shot of whisky before killing and they make fairly good eating. Not so with any wild fowl shot nearby; boiling in water for a full day rarely takes out the toughness. As for pork, all ours comes from Cochabamba, where we have a standing weekly order. You may ask why, and I'll say that although there are lots of hogs here in Pulacayo, we shall stick to a dairy farm in order to get ours. To explain: In 1891 there were less than 100 toilets in La Paz. This was unsanitary to be sure, but the politicians were anxious that there should be no more as they carried on a thriving business by maintaining scores of hogs which roamed the streets as scavengers, were slaughtered, and were sold as meat. The La Paz of 1891 is the Pulacayo of 1936, except that the politicians are not the owners of the hogs who roam the areas of the toiletless town.

As a fitting end to this tale perhaps I should add a little story that keeps going the rounds here, actually occurring not too long ago. A newly arrived gringa (wife of one of the Company's engineers) went to market and purchased a hen, *gallina*. On her return home she began to entertain thoughts of raising her own chickens and rushed back to buy a rooster. On arriving there the second time she found herself stumped for the word *gallo*, and so, in all seriousness, asked for a *gallina hombre*, or man hen. The woman handed her a rooster and never let out so much as a snicker. The natives allow you to go on making mistake after mistake in your Spanish, but they are too well mannered to correct you or to laugh at some of the silly things that may be said.

On February 22 (no, Washington's birthday is not celebrated) begins a week of *fiestas*. The whole thing is known as *Carnaval* and is the Mardi Gras of South America, or the opening of the Lent season. I'll try to take it all in and give a description of it in my next issue. — ROBERT C. BECKER, *General Secretary*, Compania Huanchaca de Bolivia, Pulacayo, Bolivia, S. A. HOYT P. STEELE, *Assistant Secretary*, 2440 Orrington Avenue, Evanston, Ill.

1935

Greetings and salutations, Gang. The coming of the new issue of The Review marks the passing of another month, and we hope records jobs for a few more members of the Class. Your Walter Winchell has turned lazy, all of a sudden, and absolutely refuses to go through the many hours of laborious work required to edit

the material so as to give it by Courses. Beginning this time with news items, information from school, and so on, I first of all have the disagreeable information for you that one of the members of our Class has met with an untimely end: Paul C. Cooper was killed by a train on January 26. I am sure we all regret the loss of this classmate and join in expressing our sincere sympathy to his parents. — I have a marriage to announce, this time: Daniel B. Clapp and Miss Charlotte L. Clapp were married on January 25. Best wishes to you both! — I. H. Munro and Claudine M. Bedell are engaged. — Our last clipping indicates that Philip H. Johnson won the Pershing Medal for attainment in military education. He made a trip to Washington for the presentation on January 10. Congratulations, Phil!

A rumor has found its way up to this cold country that Hugh Fenlon is working for Electric Bond and Share Company, in New York City. I had a letter from Johnny Talbert which was in such a condensed condition that the best thing I can do is to give it to you verbatim: "First, about my three roommates in that well-known track fraternity (?) on Corey Hill, Brookline: (1) Al Greenlaw — very little news — supposed to be working in Connecticut at some job connected with what he studied at school — what's your address, Al? (2) Cars Brooks — slaving away in the electrolytic department of the Hooker Electrochemical Company. Despite the slaving and hard work, his mother's good home cooking has added about ten or 20 pounds to his weight. He needs track and Oscar. (3) Jack Colby — in Boston, at least on a few week-ends — working out of the Boston office of the Johnson Service Company (heat regulation) — using his personality to sell all their gadgets to New England. (4) That means me — getting practical experience in the experimental engine test house of the Wright Aeronautical Corporation before advancing to the engineering department. I'm bringing all my theoretical knowledge down to earth and facts. Interesting, but the usual squawk about not much pay. Now about some of Course XVI men I've heard about: (1) Abe Randall (my thesis partner) is living with Brooksie and his folks at Lockport, N. Y., and working for the Harrison Radiator Company, a subsidiary of General Motors — something to do with tool and die cast estimating. (2) Karl Achterkirchen — still at school taking graduate work and studying stressed skin under Professor Newell. Going to fool with the tin can on the first floor of Testing Materials Laboratory — not so much studying and therefore more time to raise hell with the girl's schools. (3) Bob Goodman — at school too — welding assistant and general nuisance. (4) Guy Haines — at Pensacola with the Naval Reserve. (5) Bill Stark — at Brewster on Long Island. (6) Chris Rafferty — with Pioneer Instrument. (7) Wachs and Wiener — with Lycoming. Wachs dropped in on me a while back — testing vibration of one of their props on one of our engines. (8)

THE TECHNOLOGY REVIEW

Agnew — with T.W.A. in Kansas City. (9) Moffatt — with Consolidated in California. (10) Clark and Gale — at Bendix. Well, I guess I've gabbed enough. This ought to furnish a few lines for that column of yours." You're certainly right about that, Johnny. Thanks a lot.

Another quotation for you, fellows: "To make up somewhat for my unbroken silence since graduation, I'll try to furnish you with some pertinent information about some of the other lost sheep. I've been working for General Chemical Company since September and have been in their plants at Edgewater, N. J., Baltimore, and Marcus Hook, successively. I got out of the trenches shortly after Christmas and am now in the Buffalo sales office. The climate here has the same relation to that of Boston, as Boston's has to Palm Beach. My recommendation to anyone who may be interested is never to come to Buffalo unless he has to and, even if he has to, don't come. While I was in Wilmington working at the Marcus Hook plant — where Freddy Lincoln was also — I lived with Proctor Wetherill '34 and saw a good deal of Hal Bemis and Charlie Taylor. Bemis is still bearing a charmed life, dissipating more than ever before and still getting away with it. He is spreading utter ruination among Philadelphia's fairest, and works for Campbell's Soup on the side. He and I attended an alumni banquet in Philadelphia at which Lobby spoke and, in the course of the speech, directed several libelous remarks in our direction anent the senior banquet. Charlie Taylor is working for the Riegel Paper Company in Milford, N. J., and is being vastly efficient. It is rumored that he is installing Ferny's Newport News system there, trying to make battleships out of cellophane or something like that. I've also heard from Wes Loomis; he's working for Automatic Electric in Chicago, and from his letters I can't quite make out whether he is chairman of the board or only president. Pat Patitz is now representing Foster Wheeler in Rochester. He has memorized his steam tables and greatly increases the entropy of the universe every time he opens his mouth. Phil Johnston is due to arrive in Rochester shortly to stay for two or three years and also to keep Pat company. He works for Carrier and when he and Patitz get together the air is thick with coefficients of thermal conductivity and great relative humidity. That covers the waterfront to the best of my ability." That letter was written by none other than John Duff.

You'll have to forgive me for the wholesale quotations, but it is a mighty easy way to cover a large amount of material. Here is another one for you, this time from a letter written by Johnnie Ryan: "On July 1 I went to work for Republic Steel Company, here in Youngstown, as research assistant in the electric welding of pipe. I looked up two fellows from Course III, the Class of '32, Denny Curtin and Tommy Hannafin, both of whom are working in the metallurgical department of Youngstown Sheet and

1935 Continued

Tube, and I have been living with them ever since. At first we roomed in the same house, but in September, Mort Jenkins came to join us and work with me in the same department. We were a little crowded for space, so we looked around and hired a furnished house with two other young metallurgists, one from Case and the other from Lehigh. That was in October; we have been living in the same house ever since and taking life very easy and fully. On December 15 I left Republic and was hired as an assistant metallurgist by the Carnegie Illinois Company, also here in Youngstown. Several days later Jenkins moved in with me, and we have been working in the open hearth ever since. So much for our business — socially things are beginning to hum around here, and with the coming of warmer weather, no doubt the inhibited passions of the winter will be allowed full sway and reign. As for the rest of Course III, I don't know much recent news. The last time I heard from any of them, this was the situation: John Brosnahan was working for Bethlehem Steel in Bethlehem, Pa.; John Seaver, with General Electric in Schenectady; Jim Eng, as complaint metallurgist with Halcomb Steel Company in Syracuse. This job of seeing that Jenkins does not get into any complications with some of his high-quality lady friends keeps me on my toes all the time — we've named him Casanova. The news of the Class is eagerly scanned every time *The Review* arrives. We enjoy it immensely, and we have had ample opportunity to compare it with the Case and Lehigh alumni magazines, but it is ridiculous even to try to compare them. The *Review* beats them all hollow. My best regards and hopes that these other fellows will find time to write you and give us the latest dirt on what they are doing."

Still another quotation, my dear fellows; this time a bit of humor from Paul Goldberg: "There's damn little news about myself to tell. You probably know that Bill Abramowitz and I drifted around New Jersey early last summer looking for a few opportunities to utilize our Tech training, and I took a jim-dandy vacation for myself, touring the National parks and visiting the California-Pacific Exposition. Don't let the California Chamber of Commerce fool you about the weather out there, either. When it decides to rain there, it does it quite as casually and efficiently as any place. Bill also wrote to you about the smash-up out in Colorado, but he didn't know, and still doesn't know, about the girl I met on the way home — you know, the kind that makes you forget that you're a piece of human hamburger trying to convalesce. But, enough of that; it brings me to the point where I entered the graduate school and started shooting for a star that said Ph.D. on it. I guess the old school grows on you after a while — I hate to leave it, to go out into the cold, cruel world. Here's some news, practically red hot: Ben Blocker, my old inseparable, is working for a Boston lithographing company. Now we've got

to see that he doesn't get married, sudden-like. How is the matrimonial mortality in the Class? 'Thirty-six lost A.T. Hunter months ago. Perk Ehrlich, Howard Mason, and I, the representatives of V '35 in the graduate school are brushing our teeth twice a day and seeing our Bursar twice a year, but we'd like to send our regards and best wishes from the old factory to you, Bob, and the rest of the Class out in the industrial world."

From a letter by Jack Hossfeld we learn that Gerald Rich was married on January 4 to Verna Mackay in New Hampshire. They are now living in Malden, and Jerry works for Hygrade-Sylvania Corporation in their engineering department. Mal Porter is still out West, and is now in charge of a small mine. Seems as if his girl at Smith is getting quite lonesome. From the Alumni Association we learn that Mal has been constructing a crushing and flotation mill in connection with G. B. Hulett '34. They had so many earthquakes out that way that the various tremors are referred to by number. Earthquake Number 471 made the brick mill building unsafe, and several weeks were used in bracing the wall. A little later a cold snap came suddenly and as the power was shut off, everything containing water froze up, resulting in many broken pipes. Everything dates according to the earthquakes; after Number 61, Mal visited Stan Lane and C. P. Stratton '34, who are working at the East Helena smelter. Well, I guess it won't be long now until Mal will be the owner of a long list of valuable mining properties, with valuable aid from the Smithite. Henry Kimball and Jack are still in the experimental department of the United Shoe Machinery Corporation.

News from H. M. Arakelian: Following graduation he started to work for the Gulf Refining Company at their Philadelphia plant. He was operating the gasoline treating plant, the chemical plant, and the pumping equipment. He had no competition and received high wages, but his health couldn't stand the gaff of the acid fumes and shift work. At present, he is operating his father's garage, and will probably remain there until spring. Fiske King is in Ambler; to use his own words: "I expect to stay in Ambler for some time yet. It's a nice spot and I'm quite satisfied." Jim Notman is at the B. F. Sturtevant Company and is now in the drafting room, which is part of his sales training course. Dick Lawrence has a new job now with the Jenny Manufacturing Company. He is in the office in the Chelsea plant and previously worked for six summers in one of their gas stations.

Another quotation, this time from Jeff Farmer: "... I am on the Goodyear Engineering Flying Squadron, but don't let the name fool you, it is essentially the same as most large companies' training groups except that most of the work consists of practical work in the departments rather than a lot of school work, like, for example, the Firestone Company. I like the work a lot and can recommend Goodyear as the best company to work for in

the industry. I say this from what I have run into and from what older men of more experience say. I started last July right after ORC camp in what they call the production squadron, and worked for two months in the belt room where all belts are cured. In September I was transferred to the engineering squad where I am now. At that time I worked as an electrician, then as mechanic with a repair gang, and from that I went outdoors to a surveying job which Goodyear was doing for the city of Akron. That lasted up to Christmas, at which time I was transferred back into the plant to the engineering staff in the heating and ventilating division. That work seemed to me to be the best of all, since it was Course II stuff and I had a chance to use my own head for a change. Last week I was shoved into the maintenance analysis division of the staff where I am now. I haven't got oriented very well as yet, but as in the past, it will probably prove to be more interesting than previous jobs. In addition to this work I attend school two hours a week and gym one hour, for which I get paid. The set-up here on the squad is that you remain on it for a maximum of three years, during which time you look around for a good place to 'light.' Most fellows transfer off the squad before their time is up, but it is permissible to remain the whole three years and graduate. Graduates get a certificate showing them to be Master Rubber Workers. The M.I.T. Association here is quite weak, considering that there are approximately 100 graduates, but right now it is trying to come to life through the efforts of Earl W. Glen '29 and F. Payson Hammond '25. We had a dinner and dance last Saturday and about 23 couples and one stag showed up. The one stag was George Reece, who is with the United States Bureau of Public Health, or something like that, here in Akron. He is living at the Y.M.C.A. I guess the only other news that would interest you is that I am within 30 miles of McFadyen, a Beta, who is in Cleveland with General Electric. His address, in case you haven't it, is 1842 Hastings Avenue, Cleveland, Ohio. Bernie Nelson, another, is in Buffalo with the New York Telephone. We all are going to get together here soon. Bernie's address is 295 Bird Avenue."

The next letter is from Chicago, my old home town. Charlie Debes wrote the following about his troubles in finding (?) a job: "First of all, everything is O.K. out in this section of the country — that is, generally speaking. Fellows now come up and ask you for a quarter instead of a dime. Trow Leavitt came into town last December and we went out together a few times. At present he is down South, traveling with his mother. Rather tough, don't you think? He will, I think, go back to school next February — at least, those are the plans he told me. Harvard, if you must know, is the institution in mind, though it breaks my heart to tell you. Sold up the river, that's what. ...

"Three days after graduation I went to New York for a day's visit and from there drove out to Chicago with my mother.

Plan to attend Alumni Day at M.I.T. on June 8, 1936

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After a week back home, my grandparents took me out to the Dakotas to spend the rest of the month in resting. On the way East we stayed on a farm in Iowa for a week. There I tried out my hand in cultivating and weeding; I also did a turn at milking, but the cow balked. I don't blame her a bit, however, seeing as how a glass of milk was all that ten minutes effort could provide. Anyway, it was good preparation for the future job, as you shall see. In the second week in July my grandfather brought me down to the International Harvester Company and introduced me to the big boss for hiring. From then on, much to my surprise, it wasn't a question whether I would get a job, but what type of work would I like. After all the black pictures painted for us electrical engineers at Technology, I was rather floored at the suddenness of it all. It seems M.I.T. has a much better reputation out here than in the East. After a few conversations with several men down there at the main offices, I thought that if I could get out and get some practical experience in one of the plants, it would be the best foundation for almost anything to follow. So I went out to the McCormick works at Western and Blue Island Avenues. I am with the electrical department at present. The electrical engineering department here installs all electrical equipment and does the maintaining, repairing, and testing of it. For the first two weeks I was in the drafting room, taking the place of the electrical engineer who was on vacation. I had told them before that I wanted some practical experience so when he came back they gave it to me. The first job I had was installing a three-inch conduit up in the ceiling of a foundry with the temperature about 140 degrees. The ceiling was some 30 feet in the air and there was so much smoke up there that you could hardly breathe. To install the conduit it had first to be carried up on a nice wobbly extension ladder; from there operations were shifted to a wide three-inch I beam — this 30 feet up. Of course, once up there we attached safety belts so we could work with more ease; but those darn pipes weigh from 80 to 90 pounds and to go galivanting around with them was an art. (There are two fellows to a pipe, in case you are wondering.) This line was 200 feet across. If we installed three 10-foot sections a day, we were satisfied. Six weeks of that and then I was shifted to engine room maintenance. That was a big improvement. Its duties were as implied by the name, the maintenance of all electrical equipment in the engine rooms. Oh yes, I forgot to mention that they were building a million-dollar power house here, which at the present time is about half-finished. The Combustion Engineering Company of New York is doing the work.

"In the first part of November I was again shifted to the testing department. This is the best job of them all. In it I have to clean, adjust, and repair all the Leeds and Northrup temperature-controlling devices, some 45 of them; make and standardize all the thermocouples we use in the furnaces; and make tests on dif-

ferent types of apparatus to determine if they are overloaded. Then, in my spare time, I can fix the bosses' fans, hair driers, radios, electric trains, and so on. I like the work very much, but here is the funny part of it all: Work starts at 7:30 in the morning and I live some 12 miles north of the plant, so it means that I start out to work at 6:15 A.M. If you don't think that is early, try it during these winter months."

Still another quotation for you, my laddies: "As you know, my home is in Dauphin (about eight miles up the river), but for the winter we have moved to an apartment in Harrisburg. This is very convenient, since I just drive to work. Also, my girl lives about five blocks from here. Enough said about where I am and why. I haven't heard from Bob Anderson for some time, but from all indications he is enjoying himself at Sparrows Point, Md. When nice weather begins to roll around again the three of us will very likely get together for a week-end. As for myself, things have been pretty good: Last June I got a job with the Harrisburg Steel Corporation as an inspector in the coupling shop. The work was very dirty and the hours, from 7 A.M. to 3:30 P.M. I progressed fairly rapidly at that, though there was only one raise in wages, which came after about six weeks. Soon I got to doing rather special work in the same line. The bosses got to know me pretty well, and everybody treated me fine. I liked the work, but I didn't like the hours or the dirt. About Christmas time the chief engineer, whom I had never met, came to me and asked to see me in his office. We had an interview and a very pleasant chat. To make a long story short, I landed a very nice job in the engineering department. I now work with the chief, the president, and so on, and believe me, there is a darn fine bunch in that office. I am the only new man they have taken on, which puts me in the spotlight. It's going to be plenty tough, but I'm now in the main office, with office hours and a salary. This is really news, it happened only last week. In fact I can hardly realize it yet, but it must be true. How I ever got into the office without pull is beyond me, for it is generally conceded that pull is absolutely necessary for such a break. Right now I am doing estimating work, but as soon as we get caught up on that, the chief is going to start me right in on engineering. This is a small plant, as you know, but it has possibilities when the general business conditions improve. Let's hope that things will move right along in the next few years. I have a tough job ahead of me, but Technology hardened me to that sort of stuff." The above note was written by Bob Landis.

A lovely epistle from Hal Bemis reveals that he is working for Campbell Soup, where he is undergoing the rigors of a training course which he thinks is designed to acquaint him with the most cherished and hidden secrets of the vegetable world. He now has a very profound knowledge of the length, width, color, temperament, and so on, of carrots, pota-

toes, tomatoes, and all other miscellany that can be crowded together in the form of soup in one of the Continental Can Company's best cans. Hal reports that Howard Bernhardt is with Campbell's also, but in the laboratory. It seems to me that if it has taken these boys such a long time to learn all about soup, they will be gray by the time they get to nuts. Howard puts on a good show of flourishing amongst the test tubes and burners in a most efficient manner, but seems to find time enough to visit Washington more frequently than merely to see the buildings.

A note from Case Rucker reveals that he is now on the way to the first rung of the ladder in Sears, Roebuck and Company. He is in the shipping and receiving room, learning the groundwork of the business, and raising a sweat upon his manly brow. — Paul Mormino writes the following: "Well, here goes! For the past six months I have been working for the Commonwealth of Massachusetts as an engineer's aid. The first four months found me bouncing about the state working on sidewalk and road projects. Last November, however, I was transferred to Newburyport, where the state is constructing a highway bridge (on the Turnpike) to eliminate a dangerous grade crossing. The work is well under way and the bridge is scheduled to be completed next September, so I will probably be stationed in Newburyport for at least eight months. I find the work here very interesting and I would even enjoy it if only that damned cold weather would stay away."

Vin Mooney, when last heard from, was finishing a term of graduate work at the Institute and getting ready to spend the second term back with General Electric. He also gives the pleasant news that 100% of the Course VI-A boys are employed. — Paul Herkart is with R.C.A. Radiotron at Harrison, N. J., making power tubes. His most arduous labor seems to be that of speeding up the production of special tubes for test purposes. According to Paul, Otto Zwanzig has started work with Public Service of New Jersey. Paul also gives the following interesting note about Harold Oshry: "H. M. Oshry is considering a move to Chicago from the Kearny plant of the U. S. Steel Company. Mr. Oshry is undecided whether to accept the position of treasurer or secretary of the company, both of which he has been offered. As you see, the fate of the U. S. Steel is in balance." — According to Paul I made a mistake about Oshry's location in the February issue of *The Review*. The Kearny, N. J., address is correct.

One month we had 7,500 words in this column; let's try to break that record. If you have tired of writing to me, try our new assistant secretary. Jack Hossfeld has resigned from that position and Dick Lawrence has agreed to take on its responsibilities. — ROBERT J. GRANBERG, *General Secretary*, 172 Water Street, Eastport, Maine. RICHARD LAWRENCE, *Assistant Secretary*, 111 Waban Hill Road North, Chestnut Hill, Mass.

Plan to attend Alumni Day at M.I.T. on June 8, 1936

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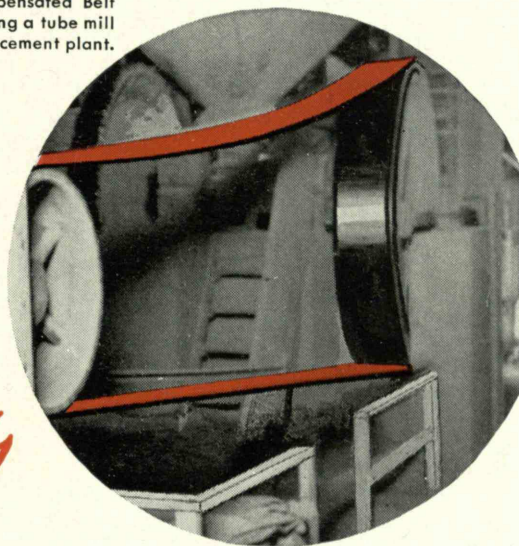
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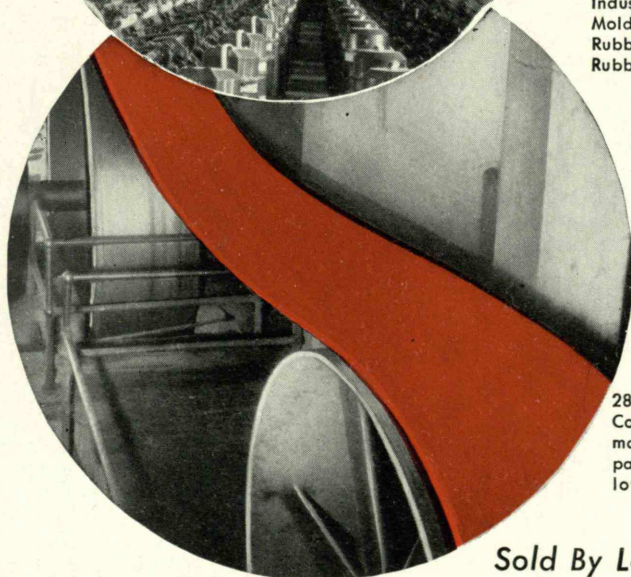
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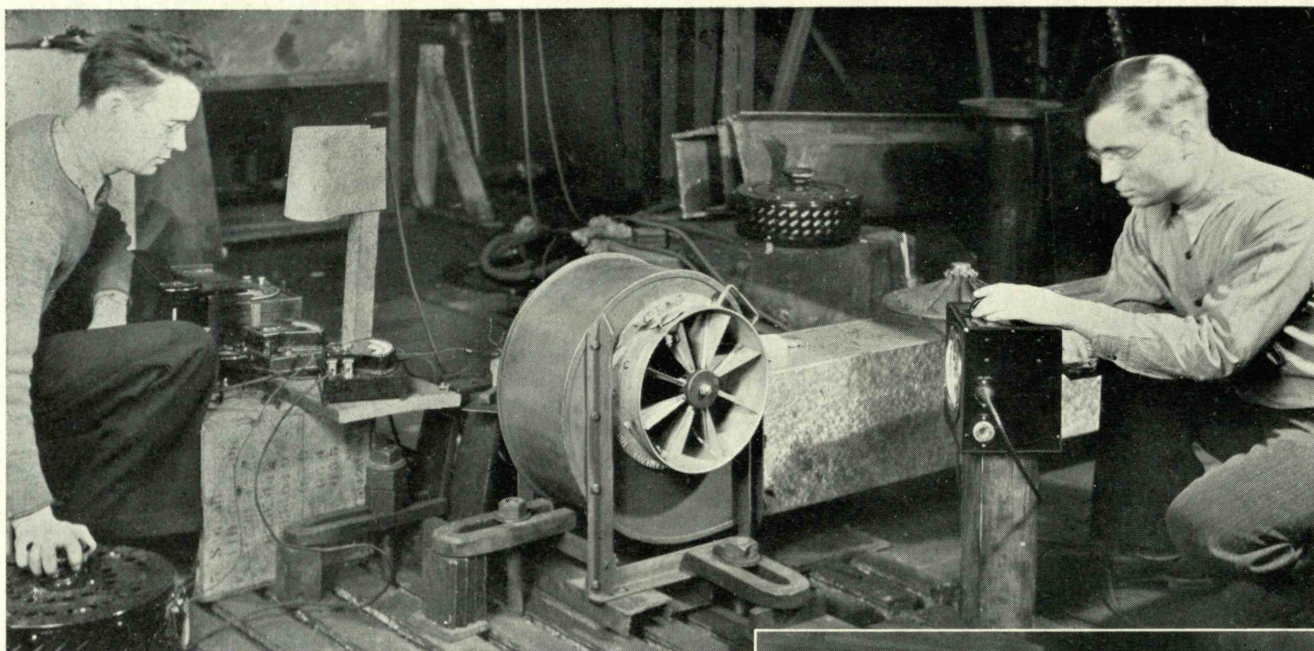


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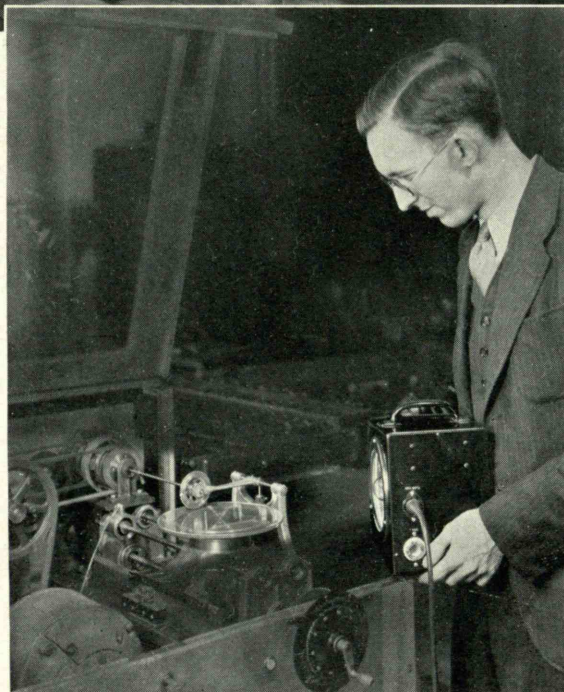


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